

National Forest Sector Development Program, Ethiopia

Volume I: Situation Analysis



*Empowered lives.
Resilient nations.*



National Forest Sector Development Program, Ethiopia

Ministry of Environment, Forest and Climate Change (MEFCC)

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Disclaimer

This analytical desk-based review relies mainly on existing documents. When possible and appropriate, the authors provided their critical views based on their own experience and expertise of land use and forestry in Ethiopia and abroad.

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NATIONAL FOREST SECTOR DEVELOPMENT PROGRAM, ETHIOPIA



Foreword

Ethiopia is highly vulnerable to the impacts of climate change, with droughts becoming more frequent and severe because of its limited potential to mitigate and adapt. Though forests play a critical role on reducing the negative consequences of climate change and contribute to environmental sustainability and the national economy, forests cover loss has continued to be a concern.

Investment in the forest sector is a strategic move to mitigate the impact of climate change and as such is a key component in Ethiopia's national growth and transformation plan. The forest sector is also a strong component of the Sustainable Development Goals (SDGs), particularly SDG 13 Climate Action and SDG 15 Life on Land.

UNDP is a strong advocate for country-led and country-owned strategies that address the underlying causes of deforestation and continues to support Ethiopia's Climate Resilient Green Economy strategy.

Our support to the country to ensure sustainable management of forests has prioritized providing technical and financial support to the Government of Ethiopia in the design and implementation of a 10 years National Forest Sector Development Program.

The National Forest Sector Development Program builds on Ethiopia's existing forest resources, attracts foreign investment and seeks to transform the sector to catalyse GDP growth, employment, promote alternative use of energy sources, environmental protection and sustainable use of forest products as opposed to unsustainable forest exploitation.

Going forward, UNDP's new strategic plan guiding its global work as well as interventions here in Ethiopia will prioritize providing solutions in six areas, namely poverty, resilience, environment, poverty, governance and gender equality. Our continued support for the development of Ethiopia's forest sector falls within our priority areas as transforming the sector will catalyse sustainable and inclusive development for the country.

Therefore, UNDP will build on its partnership with Norway and Sweden, to support the sector in key areas such as building institutional capacity, promoting science and research for sustainable use of forests, as well as helping expand the space for private sector involvement in forest conservation and development as well as environmental protection.

These three comprehensive volumes on the National Forest Sector Development Program go a long way to inform forest-related policies, interventions and activities to transform the forest sector in Ethiopia.

Ms. Ahunna Eziakonwa-Onochie

UN Resident Coordinator, UNDP Resident Representative and UN Humanitarian Coordinator

Preface

Forest resources of Ethiopia make a significant contribution to the national economy. With forestry being primarily a rural activity, the sector has enormous potential to contribute to the transformation of the rural economy. The contribution by the sector should also be seen in the value that it adds through harboring biodiversity resources and other ecosystem services such as fertile soil, water and clean air. The contribution of forestry to the quality of life in the urban population cannot be undermined. Therefore, alignment of the growth and transformation of Ethiopia to this critical sector is a requirement.

Over the last one year, the Ministry of Environment, Forest and Climate Change in collaboration with UNDP has given significant time, energy and commitment to the development of the National Forest Sector Development Program (NFSDP). This NFSDP was initiated to be used as the main guiding document for coordinating strategic policy interventions and sector-wide investments for the coming ten-year period. The NFSDP is comprised of three volumes that navigate through situation analysis; a series of transformational action programs and synthesis of investment options that together would help to achieve the forest sector's ambitious development goals in Ethiopia.

These program documents provide a timely update to the 1994 Ethiopian Forestry Action Program (EFAP) by incorporating emerging global and national change agenda. By doing so, the goal is to build on the country's considerable forest resources, attract foreign investment and leverage existing momentum to transform Ethiopia's forestry sector in a way that catalyzes GDP growth, generates employment, contributes towards self-sufficiency in forest products and enhances ecosystem services.

Through the three volumes of the NFSDP, we have been able to put required measures in place to ensure that challenges are addressed and the sector is transformed to the next level. I would like to thank the leadership and the experts involved in the process for their role in the development of this document. I would also like to express my sincere thanks to the stakeholders who have given their inputs and comments throughout the process.

The challenge going forward lies in the successful implementation of the program on the ground. The Government of Ethiopia remain committed to take bold measures in ensuring effective and successful implementation of this program. I call upon all development partners and other stakeholders to strengthen their support and commitment in transforming the forest sector in Ethiopia so that the citizens and Country benefit from the full economic and environmental potential of the sector.



Dr. Gemedo Dalle

Minister, Ministry of Environment, Forest and Climate Change



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List of Abbreviations

ADLI	Agricultural Development Led Industrialization	MOLF	Ministry of Livestock and Fishery
AFR100	Africa Forest Landscape Restoration Initiative	MPFT	Multi-Purpose Fodder Trees
CAADP	Comprehensive Africa Agriculture Development Program	MRV	Measuring, Reporting and Verification
CBD	Convention on Biological Diversity	NDC	Nationally Determined Contributions
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	NEPAD	New Partnership for Africa Development
CRGE	Climate-Resilient Green Economy	NFAP	National Forest Action Program
CSA	Central Statistics Agency	NFI	National Forest Inventory
ECRA	Ethiopia Custom and Revenue Authority	NFPA	National Forest Priority Area
ECAFCO	Ethiopian Chipwood and Furniture (company)	NFSDP	National Forest Sector Development Program
EEFRI	Ethiopian Environment and Forest Research Institute	NRM	Natural Resource Management
ESMF	Environmental and Social Management Framework	NRP	National Reforestation Program (of Korea)
ETB	Ethiopian Birr	NTFP	Non-Timber Forest Product
EFAP	Ethiopia Forest Action Plan (1994)	OFLP	Oromia Forested Landscape Program
FAO	Food and Agriculture Organization	PES	Payment for Environmental Services
FCPF	Forest Carbon Partnership Facility	PFEM	Payment for Forest Ecosystem Services (in Vietnam)
FDRE	Federal Democratic Republic of Ethiopia	PFM	Participatory Forest Management
FLEGT	Forest Law Enforcement, Governance, and	PPP	Public Private Partnership
FLR	Forest Landscape Restoration	PSNP	Productive Safety Net Program
FPDF	Forest Protection and Development Fund (in Vietnam)	ROK	Republic of Korea
FSR	Forest Sector Review	RWE	Roundwood Equivalent
GGWSSI	Great Green Wall for the Sahara and the Sahel Initiative	SESA	Strategic Environmental and Social Assessment
GHG	Greenhouse Gases	SFM	Sustainable Forest Management
GTP	Growth and Transformation Plan	SLM	Sustainable Land Management
GVP	Gross Value of Production	SMFE	Small and Medium Forest Enterprises
IGAD	Intergovernmental Authority on Development	SWOT	Strengths, Weaknesses, Opportunities, Threats
LULUCF	Land Use, Land-Use Change and Forestry	TVET	Technical and Vocational Education and Training
MEFCC	Ministry of Environment, Forest and Climate Change	UN	United Nations
MOANR	Ministry of Agriculture and Natural Resources	UNCCD	UN Convention to Combat Desertification
		UNFCCC	United Nations Framework Convention on Climate Change
		UNFF	UN Forum on Forests
		USD	United States Dollar
		VSLA	Village Saving and Lending Associations
		WBISPP	Woody Biomass Inventory and Strategic Planning Project

1 Introduction

Ethiopia is following an accelerated growth pathway, aiming to achieve broad-based and sustainable economic growth to reduce poverty and become a middle-income country by 2025. The Government of Ethiopia has a stated interest in strengthening the contribution of the forest sector to economic development while ensuring the social and environmental sustainability of this growth. In response, the Ministry of Environment, Forest and Climate Change (MEFCC) requested that a National Forest Sector Development Program (NFSDP) be developed to provide the master plan that serves as the roadmap for future forestry actions at the federal and regional levels. Therefore, the NFSDP is a country-driven initiative. The overall objective of the NFSDP is to increase the value of trees and forests in their different landscape contexts, acknowledging that most of the pressure on these trees stems from outside the forestry sector. The NFSDP will serve as the general framework for the enhancement of sustainable forest management in the country over the next 10 years, that is from 2016 to 2025 (FDRE 2011).

The objective of this Situation Analysis document is to support the NFSDP development by providing a comprehensive review and analysis of relevant forest-related policies, strategic documents and activities. This document outlines the status quo of the sector and identifies the main barriers and opportunities for sector development. Further, it serves as the basis for a series of consultative meetings to inform the NFSDP. This analysis relies mainly on existing documents and literature, which are combined with the expertise of the consultants given their long-term experience in Ethiopia and their comprehensive understanding of the issues, challenges and opportunities facing the sector.

The forest sector has recently been receiving pronounced attention from the Government of Ethiopia. As a result, there is a significant amount of high quality and recent analytical work that the NFSDP should valorize. These include, amongst others:

- the comprehensive sector diagnostics studies carried out for the Forest Sector Review (FSR) and the on-going preparations for the Public-Private Dialogue (PPD) between MEFCC and the private forestry sector,
- the national forest inventory (NFI) which provided the much needed update of the state of knowledge regarding the extent and health of Ethiopia's forests,
- the REDD+ strategy, which outlines the intersectoral actions that should be undertaken to reduce deforestation and forest degradation,
- the recently completed UNDP-supported study of the contribution of forests to national income in Ethiopia and linkages with REDD+, and
- the MEFCC Growth and Transformation Plan (GTP) II, which lays out the broadly accepted and ambitious goals for the sector to achieve its growth objectives.



With these policy milestones and strategies, national governments and development partners now have the opportunity to adopt a more comprehensive approach for promoting sustainable and productive forestry. This analysis is structured according to the main pillars around which the NFSDP is built, namely:

- Sustainable forest production and value chains
- Forest environmental services
- Forests and rural livelihoods
- Urban greening and urban forests
- Enabling environment and institutional development

Following three introductory chapters on 1) Global context, 2) National context, and 3) Legal and institutional framework, each chapter of this Situation Analysis report provides a concise overview of the above-mentioned five pillars. Chapters 5-8 begin with a summary of the status quo and general trends related to each pillar followed by a summary of the main barriers and opportunities identified. This provides the basis for the next phase of the assignment, where the action programs will be detailed.

In addition to this desk-based review, the NFSDP has been developed based on broad stakeholder participation, with multi-stakeholder consultations providing key inputs for the program. The NFSDP team relied on the contribution of a wide range of sector stakeholders, including representatives from other Ministries and sectors who were brought together for the project launch at the situation analysis workshop. The objective of the workshop was to validate the findings of this Situation Analysis and gather input for the next “Programming” phase.

2 Global Context

2.1 Status of forest resources, opportunities and challenges

According to the Forest and Agriculture Organization of the United Nations (FAO), the rate of global forest loss is declining. As shown in Table 1, in the 1990s, the net loss of forest (natural and planted) was -0.18 percent (FAO 2015). Between 2010 and 2015, the net loss of forest was reduced to -0.08 percent. Although the majority of the world's forest is categorized as natural forest (primary forest and other natural regenerated forest), the total area of planted forest has increased by over 110 million ha, covering approximately 7 percent of the world's forest area.

Table 1: Global forest area change (1990-2015)

Year	Forest (000 ha)	Annual change (000 ha)	Annualized change
1990	4,128,269		
2000	4,055,602	-7,267	-0.18
2005	4,032,743	-4,572	-0.11
2010	4,015,673	-3,414	-0.08
2015	3,999,134	-3,308	-0.08

Source: FAO 2015

It is globally recognized that the forestry sector has tremendous potential for protecting the environment and spurring economic development. Forests provide vital ecosystem services including the regulation of climate processes through the role they play in the water and carbon cycles. Afforestation, reforestation and managing their biomass production over time increases carbon sequestration and helps to mitigate climate change. Wood products then extend the storage of this sequestered carbon and wood provides as a renewable resource provides efficient and low-carbon alternatives compared to many other materials.

In addition to the many regulating and provisioning ecosystem services forests provide, the forestry sector also contributes significantly to employment and economic development of rural areas that tend to lag behind the urban areas in rapidly developing economies. A global survey estimates that more than one quarter of household income in rural areas of developing countries stems from natural forests and other natural areas (Angelsen et al. 2014). However, despite its recognized potential, the productive value chains offered by forests are underdeveloped and rarely tapped into. There are various factors for the sector's stagnant growth.

Poor governance and enforcement allows illegal logging to continue in many tropical countries, undercutting the economic gains of legal forestry operations and local communities. While illegal logging fell by nearly a quarter between 2002 and 2009, more than half of timber sourced from the main forest countries in the tropics (i.e., Brazil, Indonesia, DRC, Malaysia) are still illegally sourced



(Hoare 2015). Global market losses from illegally harvested timber are estimated to be between USD 30-100 billion annually, and government revenue losses amount to an additional USD 5 billion per annum (WWF & IIASA 2011).

In addition, forests are still under significant pressure from conversion to other more profitable land uses (e.g., agriculture, energy and mining exploration), despite global attempts to slow deforestation and degradation. This is reinforced by the fact that the economic benefits of climate change mitigation and other services provided by forests are not included in the economic valuation of forests, or its “downstream” value chains.

To address these challenges, multilateral and bilateral development partners, governments and the private sector have significantly increased support for the protection, restoration and sustainable use of forests through various initiatives and programs over the last decade. The impacts of many programs are beginning to unfold and lessons are learned from moving from project to landscape level. Yet, these promising efforts have yet to successfully trigger the as-pired transformational change towards sustainable land use at scale.

These have created new momentum to enhance and complement existing efforts. The Nationally Determined Contributions (NDC) of many countries include the forest sector, which will need to be specified and translated into specific policies and measures. Many developing countries are in the process of formulating their national plans for mitigation actions. Implementing REDD+ and the expected ratification of the Paris Agreement will provide several new options and financing for countries to collaborate. In addition, high-level political discourse on developing deforestation-free supply chains offers a new window of opportunity for including the private sector and leveraging limited public finance. Further, voluntary commitments in the context of Forest Landscape Restoration (FLR) support the operationalization of political objectives for the land use sector and forests, including through investments in forest product value chains.

With these policy milestones and tools, national governments and development partners now have the opportunity to adopt a more comprehensive approach to promote sustainable and productive forestry. The objective of Ethiopia’s National Forest Sector Development Program (NFSDP) is to increase the value of trees and forests in their different landscape contexts, acknowledging that most pressure on these trees stems from outside the forestry sector.

This situation analysis summarizes Ethiopia’s policies, strategic documents and activities relevant to the forest sector and sustainable forest sector development. This will then serve as the basis for undertaking a series of consultative meetings at the federal and regional levels and provides a framework for developing Regional Forest Sector Development Programs in the future.



The analysis is structured as follows: Chapter 1 provides a brief outline of the global context, Chapter 2 details the national context and Chapter 3 outlines the legal and institutional framework for the forest sector. The productive function and value chain analysis is provided in Chapter 4 and the environmental functions of forests in Chapter 5. Finally, forests and rural development and forest sector institutional development are provided in Chapters 6 and 7 respectively. This analysis serves as the basis to conduct the action planning that is scheduled for the next phase of the assignment.

2.2 International agreements relevant to the forest sector

In the highly fragmented international political landscape, various institutions and processes seek to promote and support the sustainable use and protection of forests. With broad support from public and private institutions and organizations, political momentum for the sustainable use and protection of forests has grown notably over the last decade. The incentive-based REDD+¹ mechanism was launched in 2010 by the parties of the United Nations Framework Convention on Climate Change (UNFCCC) to tackle forest loss by providing economic incentives for forest conservation and restoration. Numerous countries, regions and project-led initiatives are now implementing REDD+ based on UNFCCC rules and other standards. Other relevant developments within the United Nations include the Convention on Biological Diversity (CBD) of 2010 and its Aichi Targets which include at least halving the loss of all natural habitats, the UN Convention to Combat Desertification (UNCCD) and the UN Forum on Forests (UNFF).

In 2014, the New York Declaration on Forests was endorsed by more than 130 governments, companies, civil society and indigenous peoples' groups.² The declaration includes ambitious targets to end natural forest loss by 2030, restore 150 million ha by 2020 and 350 million ha by 2030. The New York Declaration on Forests also aims to support the private sector in eliminating deforestation in supply chains, and providing financial support to reduce emissions related to deforestation and forest degradation (UN 2014). This complements other voluntary pledges and initiatives including the Bonn challenge of 2011 to restore 150 million hectares of degraded land by 2020 and the Tropical Forest Alliance 2020 which seeks to reduce deforestation in supply chains. In addition to international platforms, there are important bilateral efforts. For example, the European Union has established the Forest Law Enforcement, Governance, and Trade (FLEGT) Action Plan, which includes timber legality verification licensing systems for timber imports through trade agreements with exporting countries, to reduce illegal timber harvesting and trade.

¹ REDD+ stands for "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries."

² As of April 2016, countries and private actors have pledged to restore 93 million ha, with an estimated sequestration potential of approximately 6 Gt of CO₂e and economic contributions of app. USD 20 billion (cf. <http://www.bonnchallenge.org/content/challenge>).



These ambitious policy targets are accompanied by public-private sector initiatives such as the African Forest Landscape Restoration Initiative (AFR100) that aims to restore 100 million ha of deforested or degraded land by 2030 or the 20*20 initiative in Latin America. Both initiatives provide an integrated approach for reducing the pressure on forests and rehabilitating degraded forest lands (forest landscape restoration or FLR), in particular through the transformation of supply chains and afforestation and reforestation. FLR also has significant livelihood, governance, and tenure benefits, and has received explicit endorsement in Goal 15 of the Sustainable Development Goals adopted in 2015. Relevant importance has been given to the protection of forests, as Goal number 15 commits to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

There are also growing efforts driven by civil society and private actors in the context of sustainable production, certification and company supply chains. As of 2015, there were over 300 companies with public commitments to reduce or eliminate deforestation in their supply chains, in most cases these pledges were integrated in broader sustainability policies.

2.3 The forestry sector and global trends in climate change

The human influence on the earth’s climate is becoming more and more obvious. Globally averaged temperatures in 2015 shattered the previous mark set in 2014 by 0.13 degrees Celsius. Only once before, in 1998, has the new record been greater than the old record by this much. The 2015 temperatures continue a long-term warming trend. According to independent analyses by NASA and the National Oceanic and Atmospheric Administration (NASA and NOAA, 2016), the planet’s average surface temperature has risen about 1.0 degree Celsius since the late-19th century, a change largely driven by increased carbon dioxide and other human-made emissions into the atmosphere. Most of the warming occurred in the past 35 years, with 15 of the 16 warmest years on record occurring since 2001. Figure 1 shows that temperature anomalies in Ethiopia range from between 1 and 4 degrees above the 1951-1980 baseline – i.e. considerably more than the global average.

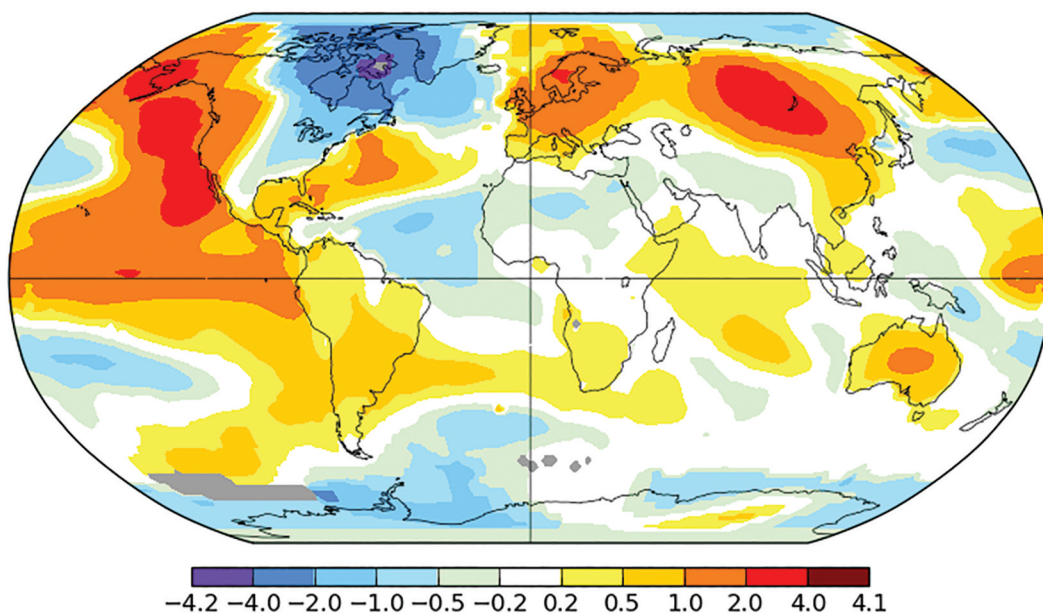
The forest sector has been an integral part of the United Nations Framework Convention on Climate Change (UNFCCC), encouraging its Parties to use the full range of mitigation options based on ecosystems and biomass. During the first commitment period of the Kyoto Protocol, however, only developed countries (Annex I) were obliged to account for human-induced emissions and removals from afforestation, reforestation and deforestation, whereas accounting for forest management remained voluntary. For the Protocol’s second commitment period, Parties decided to revise the accounting rules for forest management – allowing for harvested wood products to be accounted for by including them in the country reference levels for land use, land-use change and forestry (LULUCF).

Figure 1: Earth's long-term warming trend (Map created using 250km grid).

Annual J-D

L-OTI(°C) Change 2010-2015

0.17



Source: <http://data.giss.nasa.gov/gistemp/maps/>

Note: Earth's long-term warming trend, showing temperature changes. Orange colors represent temperatures that are warmer than the 1951-1980 baseline average, and blues represent temperatures cooler than the baseline. Gray areas signify missing data. Ocean data is not used over land nor within 100 km of a reporting land station.

In post-Kyoto negotiations since 2005, a concerted effort was made to incentivize forest countries to participate in REDD+ and address their forest and land use emissions. From 2010 to 2014, the parties to the UNFCCC defined the rules and modalities for REDD+ and agreed on a broad framework for its implementation (see Box 1 for key elements of REDD+). Recognizing the time needed to build capacity and improve forest governance, international donors supported multilateral and bilateral initiatives to address these deficits. These include multilateral pro-grams such as the Readiness Fund and the Carbon Fund of the Forest Carbon Partnership Facility (FCPF), the FIP, and bilateral initiatives by Norway, the UK and Germany.



Box 1: Key elements of REDD+

REDD+ is an international incentive mechanism designed to support the reduction of forest-related emissions. By rewarding countries for emissions reductions, REDD+ can incentivize sustainable land and forest use, forest protection, and alternative land use or livelihood models for those that lose opportunities through the protection of forests. The following elements have been defined under UNFCCC:

- REDD+ activities: Developing countries can support emissions reductions REDD+ by the following five activities: 1) Reducing emissions from deforestation; 2) Reducing emissions from forest degradation; 3) Conserving forest carbon stocks; 4) Sustainably managing forests; and 5) Enhancing forest carbon stocks.
- Accounting for results: Existing decisions include several provisions on how to measure, verify and report emissions reductions from REDD+ activities. REDD+ results are expressed in tons of green-house gas emissions, measured against a reference level.
- Finance and support for REDD+: Based on existing decisions, action for REDD+ should receive significant support from developed countries. Parties agreed that results-based finance for REDD+ may come from a variety of sources, including public and private, bilateral and multilateral sources.
- Minimizing harm and maximize co-benefits: Parties agreed on a set of safeguards to ensure that REDD+ promotes transparency, participation of stakeholders, protection of biodiversity and ecosystem services, and that it respects the rights of indigenous and local communities.

The Paris Agreement confirmed the Warsaw framework on REDD+. It also provided for the first time a universal, albeit non-binding, framework applicable to all countries to increase the actions on climate change in all sectors. The Agreement gives a number of additional encouraging signals that stress the importance of forest-based mitigation and adaptation. Specifically, in Art. 4.1, the aim is formulated “to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.” Given that a complete and rigorous renunciation on fossil fuels is highly unlikely, the contributions of sinks will have to be tremendously upscaled to compensate for remaining emissions. This and the asymmetry of sequestration (slow in, fast out) implies the need to massively enhance the terrestrial sink capacities – in other words afforestation and reforestation. In addition, Article 5 of the Agreement refers to the Convention and the mandate to sustainably manage, conserve and enhance biological carbon reservoirs. It also anchors the complete REDD+ framework adopted under UNFCCC. As such, the Agreement covers mitigation options and sets the stage for tapping the opportunities of the forestry sector.

Initial plans adopted by developing countries indicate that the forestry sector will play an important role in the implementation of national mitigation efforts. The majority of intended NDCs (at least 115 out of 160 submitted) make specific reference to the sector, mentioning afforestation or reforestation, REDD+, sustainable forest management, fire management, improved cookstoves.

3 National Context

3.1 The growing economy and opportunities for the forest sector

For the past 10 years and ongoing, Ethiopia is amongst the world's fastest growing economies. According to the World Bank (2016), the country's real GDP growth averaged 10.9 percent in 2004–2014 and it has tripled since 2004. Poverty declined substantially from 45.5 percent in 2000 to 29.6 percent in 2011 (Ethiopia CSA). Investments in public infrastructure development and sectors such as clean energy, roads, railways, and telecom have been given special emphasis to drive economic development. These investments can have positive influence on forest sector productivity and attract public and private investment in forestry as the enabling environment conditions are improved.

Ethiopia has implemented a policy of Agricultural Development Led Industrialization (ADLI) since 1991. This policy emphasizes smallholder agriculture to stimulate growth in other sectors of the economy, most notably industry. During the implementation period of GTP I (2011-2015), the government planned to start the structural transformation of the economy from agriculture-led to industry-led economic development. The aim was to gradually reduce the role of agriculture in the economy and promote industrialization that builds on the agricultural production potentials of the country. The shift to industry-led development has positive implications for the forestry sector, as the Ethiopia Forest Sector Review (2015) demonstrates the significant potential for the sector to expand and improve its industry base. However, the government of Ethiopia remains strongly committed to agricultural development reflected by high government spending in the sector, which is above the 10% threshold set in the Comprehensive Africa Agriculture Development Program (CAADP).

The country's fast and stable economic growth creates opportunities for the forestry sector. These opportunities should be captured in forest sector development planning process to increase the contribution of the sector to the country's economic development. Some of the key opportunities include:

- Political commitment of the government to build a green economy based on renewable resources such as sustainably and domestically produced wood products;
- Investment in public infrastructure, particularly in roads, railways and energy, which helps the forestry sector to become more productive and competitive;
- The booming construction sector creates huge demand for raw and processed wood products (the construction sector accounted for nearly 50% of the share of industry in GDP during GTP I);
- Clean and cheap energy supply enhances the competitiveness of wood-based manufacturing industries compared to neighboring countries in the region;
- The ongoing rural electrification program reduces pressure on forests for energy and creates significant opportunities for the production of utility poles;
- A continued rise in the working age population provides the opportunity for labor intensive forestry programs and projects;
- The growing economy of the country increases the purchasing power of citizens, which in turn increases demand for quality wooden furniture and construction materials.



3.2 Contribution of the forestry sector to the economy

The role of the forestry sector in the national and local economies in Ethiopia is significant. However, aggregate data on economic values and production of forest products and services are fragmented and inadequate. The most recent official statistics (MOFED 2015) show the sector's contribution to total GDP to be 3.3% in FY2014-15 (Table 2). However, a number of studies suggest this statistic does not fully capture the full contribution of the forest sector to the economy. Nune et al. (2009) placed the forestry sector's contribution to GDP at 9%, which is considerably higher than the 5.7% estimate provided by the national accounting system at the time.

In the GTP I five-year implementation period (2010-2015 Gregorian Calendar³), agriculture, industry and service sectors achieved 6.6%, 20.2%, and 10.8% annual average growth rates respectively. The average growth rate of the forest sector was 3.6%, considerably less than the average 10% growth in GDP over the same period.

Table 2: Gross Domestic Product by economic activity at constant prices

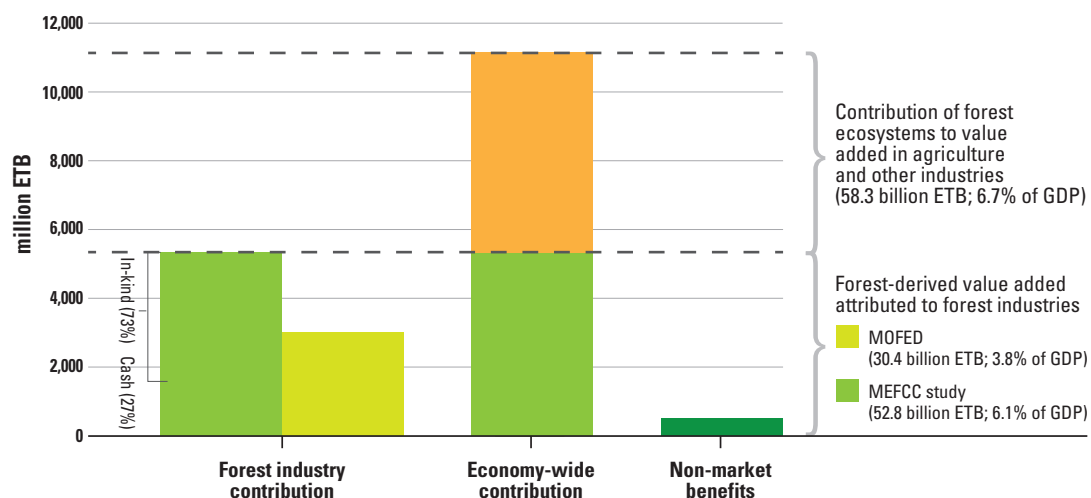
Ethiopian Financial Year	2003	2004	2005	2006	2007	2014/15 production as % of total
Gregorian Calendar	2010/11	2011/ 12	2012 /13	2013 /14	2014 /15	
Agriculture, Hunting and Forestry	212,252,688	222,664,479	238,437,963	251,339,951	267,311,808	38.4%
– Crop	146,759,975	154,081,705	166,698,857	177,663,112	190,421,592	27.4%
– Animal Farming and Hunting	45,806,146	48,287,718	50,777,182	51,834,785	54,250,139	7.8%
– Forestry	19,686,567	20,295,055	20,961,923	21,842,054	22,640,077	3.3%
Total GDP	478,866,870	519,903,443	571,493,300	630,720,069	695,345,993	
Forestry as percentage of total GDP	4.1%	3.9%	3.7%	3.5%	3.3%	
Forest Sector Growth rate		3.1%	3.3%	4.2%	3.7%	Average: 3.6%
Total GDP Growth rate		8.6%	9.9%	10.4%	10.2%	Average: 9.8%

Note: ,000 Birr (2003 EFY Base year series)
Source: MOFEC (2015)

However, a recent study (MEFCC, 2016) reports that in 2012-13, Ethiopia's forests generated economic benefits in the form of cash and in-kind income equivalent to USD 16.7 billion (111.2 billion Ethiopian Birr (ETB)), or 12.9% of the measured value of GDP (Figure 2). The largest market income benefits were associated with flows of wood fuel (firewood and charcoal) and livestock fodder from forests. In addition, 2.4 billion ETB was attributed to non-market benefits based on Ethiopians' willingness to pay to maintain forests. Further, the study suggests that current GDP estimates undervalue the contribution of the forest industry to national income by about 42%. Their assessment estimates the forest industry's contribution to GDP to be about 6.1% - i.e. more than the 3.8% estimated by MOFED (2015).

3 2003-2007 Ethiopian Financial Year.

Figure 2: Summary of forest contributions to the national economy, 2012-13



Source: MEFC (2016, unpublished)

3.3 The role of forests in the Climate-Resilient Green Economy

Ethiopia aims to achieve middle-income status by 2025 through implementation of the Climate-Resilient Green Economy (CRGE) development strategy. The strategy identifies four strategic pillars for CRGE implementation and forestry is one of these pillars. The CRGE baseline scenario showed that agriculture and forestry together contribute 85% of the country's total GHG emissions, out of which emissions from the forestry sector account for approximately 37% (FDRE 2011). Therefore, protecting and re-establishing forests for their economic, social and ecosystem services has been given due emphasis. The CRGE sets the target to afforest/reforest three million hectares and improve management of four million hectares of forests and woodlands.

REDD+ is considered a promising approach to achieving the CRGE mitigation goals. Ethiopia has been in the REDD+ process since 2008 and is a participant country of the World Bank Forest Carbon Partnership Facility (FCPF).⁴ The REDD+ Secretariat under MEFC is coordinating the REDD+ readiness phase, supported by a multi-stakeholder steering committee and technical working groups. The implementation of REDD+ is expected to have positive environmental, economic and social impacts. Particularly, the reduction of deforestation and forest degradation will have a positive impact on forest biodiversity conservation, watershed protection, climate regulation and sustainable livelihoods. The national REDD+ strategy emphasizes resilient green growth in rural Ethiopia through productive forest

⁴ For background information on Ethiopia's REDD+ process, see the FCPF Country Webpage: <https://www.forestcarbonpartnership.org/ethiopia>.



landscapes, healthy forests and productivity enhancement of land around the forests to achieve (i) reduced GHG emissions through avoided deforestation and forest degradation and carbon sequestration through tree planting; (ii) reduced vulnerability of rural populations and the rural economy to exogenous shocks from climate risks, disasters, drought, flood and disease; and (iii) reduced level of stress on biodiversity, water, and soil resources.

In recent years, a number of encouraging policy and legal measures are being adopted by governments (Federal and Regional) to support sustainable natural resource management, including forest resources. These include: implementing the CRGE with its forest carbon strategy; establishing a new Ministry of Environment Forests and Climate Change (MEFCC) to reorganize efforts in the sector; scaling up of Participatory Forest Management (PFM) that would lead to the empowerment of communities in forest management; an extensive reforestation and afforestation campaign to address land degradation; and land registration and certification to enhance land tenure security.

3.4 Relevant international agreements ratified by or agreed to by Ethiopia

Ethiopia is considered a model for other countries on the continent for its ambitious and inter-sectoral CRGE strategy. Moreover, Ethiopia played a leading role in unifying African voices during international climate negotiations. Ethiopia is also a major player in the New Partnership for Africa Development (NEPAD), whose strategic framework for Pan-African socio-economic development places climate change and sustainable natural resource management as a corner-stone. The endorsement of climate change adaptation and mitigation strategies by the African Heads of States and Regional Economic Community (e.g. IGAD) further support Ethiopia's climate-resilient policies and strategies.

Ethiopia is one of the 11 African countries that endorsed the Pan African Great Green Wall for the Sahel and Sahara Initiative (GGWSSI) to establish a green wall to prevent the expansion of the Sahara Desert, which stretches from Senegal to Djibouti. Understanding the objective of the initiative and its compatibility with the country's green development strategy, and forest sector development in particular, Ethiopia accepted and ratified the treaty to establish the GGWSSI by Proclamation No. 842/2006. Moreover, Ethiopia has ratified the following international conventions and treaties of relevance to the forestry sector:

- UN Framework Convention on Climate Change (UNFCCC),
- The Kyoto Protocol to the UNFCCC,
- The Paris Agreement to the UNFCCC,
- Convention on Biological Diversity (CBD),
- The Nagoya Protocol on Access and Benefit Sharing,
- Convention on Migratory Species of Animals,
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
- UN Convention to Combat Desertification (UNCCD),
- World Heritage Convention: Concerning the Protection of the World Cultural and Natural Heritage.



The ratification of the above-mentioned international and regional conventions and treaties show the commitment of the nation towards sustainable development of its natural resource base for the well-being of its society.

3.5 GTP I Performance and GTP II Sector Targets

3.5.1 Performance of the forestry sector in GTP I

Ethiopia sustained rapid, broad based and equitable economic growth, increased investment in infrastructure, human development and institution building during the implementation of GTP I, which laid the foundation for the long-term transformation of the nation. When GTP I was formulated, the forestry sector was managed under the natural resources division of the Ministry of Agriculture and Natural Resources (MoANR). The Environmental Protection Authority (EPA) was also partly responsible for the REDD+ process and international climate negotiations. Significant achievements in natural resource conservation and management have since been made throughout the country. The launching of the CRGE has inspired and mobilized the nation. Improved watershed management, soil and water conservation, and massive tree planting activities have been achieved through well-organized social mobilization nation-wide. Performance in this regard is therefore well above the target set for GTP I. There was also a target set to establish pulp and paper industries during this period. However, this has not yet been achieved.

In general, the full potential of the forestry sector was not mobilized to contribute more to the economy of the nation due to the absence of a lead institution for the sector. There was fragmentation and overlapping of roles and responsibilities between different implementing institutions, both at the federal and regional levels. After carefully evaluating the situation, the government decided to establish the Ministry of Environment and Forests (MEF), which later changed to the Ministry of Environment, Forest and Climate Change (MEFCC) in 2013. Since its establishment, the Ministry has been working closely with government, NGOs, development partners, civic, research, and academic institutions to achieve the mandate and mission given to it by the government.

Revision of the forest proclamation started during GTP I to update the current institutional framework to better reflect the prevailing social, economic and environment conditions as well as international developments. Simultaneously, regulations and guidelines to facilitate the implementation of the revised policy and proclamations are also under way.

3.5.2 Forestry sector related targets in GTP II

The overarching objective of the Second Growth and Transformation Plan (GTP II, 2015-2020) is to realize Ethiopia's vision to become a lower middle-income country by 2025. Thus, GTP II aims to achieve an annual average real GDP growth rate of 11 percent within a stable macroeconomic environment while at the same time pursuing aggressive measures towards rapid industrialization and structural transformation (NPC 2015). Building a Climate-Resilient Green Economy is one of the central strategies to achieving GTP II objectives.



The forestry sector is receiving strategic attention in GTP II as a key sector that can contribute to Ethiopia's industrialization goals, especially through expansion and the sustainable management of the forest resource base to feed the growing wood-based industries. Ethiopia's economic growth requires an increasing amount of forest resources, including wood products for construction, furniture, electrification, and the pulp and paper industry. Further, forests also provide non-timber forest products that are important sources of livelihood for local forest-dependent communities.

The demand for forest products and services is best met through the promotion of domestic production. This is because forest establishment and sustainable management not only contribute to economic goals, but also have significant potential to generate social and environmental benefits, reduce poverty in rural areas while addressing land degradation, soil erosion and improving water filtration and retention.

Increasing the nation's forest cover and the contribution of the sector to GDP are some of the key targets highlighted in the GTP II. Moreover, there are also other cross sectoral targets where the forest sector has a contribution, thus creating further opportunities for the sector to contribute to national development (see Annex).

The five-year GTP II (2015-2020) is a comprehensive national plan for public investments as well as legal and institutional reforms to create the enabling environment for private sector and community engagement. The MEFCC GTP II actions include, among others creating an enabling environment for the private forestry sector and related industry, enhancing the establishment of community-based organizations to allow active community participation in the sustainable management and conservation of forests, and providing economic and ecological benefits to vulnerable communities, especially for women and youths. These interventions are also expected to result in the potential of the sector to generate green jobs being more fully realized.

Compared to the time when the EFAP was prepared, the development of the current NFSDP has better enabling conditions. Key advancements include:

- The presence of a lead institution to implement the programs,
- On-going revision of the forest proclamations to adapt them to current realities,
- On-going process to develop regulations and guidelines to implement the policy and proclamation,
- Commitment from development partners to implement CRGE in general and forest specific initiatives such as REDD+ in particular.

4 Sustainable Forest Production and Value Chains

4.1 Forest vegetation cover

In Ethiopia forest is defined as land occupied with trees (natural and planted, including bamboo) attaining a height of more than 2 meters at maturity, canopy cover of more than 20% and covering an area of more than 0.5 ha, with a minimum width of 20 meters or not more than two-thirds of its length. Due to its large land size and diverse physiographic features, the country is comprised of various natural and man-made vegetation types that fulfill the previously outlined definition of forest.

Forests in Ethiopia show a variety of structures and composition resulting from the interplay between a great variety of altitudinal, climatic and soil conditions, and various human interactions. Many scholars have attempted to categorize the forest vegetation in Ethiopia (Logan, 1946; Chaffey, 1979; Friis, 1986; Friis and Mesfin Tadesse, 1990; Friis, 1992). Most classifications are based on climate, physiognomy and species composition. The natural forest vegetation of Ethiopia comprises several sub-types conventionally defined as:

- dry evergreen Afromontane forest;
- moist evergreen Afromontane forest;
- transitional rainforest;
- lowland, dry evergreen forest;
- Combertium-Terminallia broadleaved woodland; and
- Acacia-Commiphora small leaved woodlands (only a small part of these qualify as per the definition of forest).

The dry evergreen montane forests are those found in the temperate highlands, which is relatively less humid and with cooler temperatures. They are dispersed throughout the country, concentrated in central, southeastern, eastern, northern and also southern highlands. Examples of the dry Afromontane forests are the Munessa-Shashamane forest, Menagesha-Suba forest, Wof Washa forest, Borena Saint forest, Yegof Rike forest, Jibat and Chilimo forests, Adaba–Dodolla forest, Megada, Arero and Yabello forest, and Deasa forest. Some of the commercial tree species in this forest type include the two Ethiopian conifers (*Podocarpus falcatus* and *Juniperus procera*) along with species such as *Olea africana*, *Hagenia abyssinica*, *Prunus africana*, *Ekebergia capensis*, *Ficus sur*, *Ficus vasta* and others (Table 3).

Dry Afromontane forests have been heavily deforested and degraded due to their location in areas suitable for settlement and agriculture (Lemenih and Bongers 2011). These areas have been inhabited by humans for millennia, and the pressure on forests has been substantial. Today, few patches of the original dry Afromontane forests of the country remain. In the far north they are found only around churches and monasteries.



These are found mainly in the humid southwestern and western parts of the country. A small humid forest is also found on the southern slope of the Bale Mountains, called the Harena forest. The humid Afromontane forest of Ethiopia is the richest ecosystem in terms of species (Senbeta 2006). It is the center of origin and diversity of *Coffea arabica*; the only ecosystem in the world where *Coffea arabica* plants exist in wild conditions (ibid.). This makes the moist forest ecosystem of Ethiopia a resource of global importance. These forests are part of the Eastern Afromontane biodiversity hotspot region.

Floristic analyses of some sections of the moist Afromontane forest recorded over 650 plant species in 118 families (ibid.), with 5% of the list being endemic plant species. Some commercially important species in the moist Afromontane forests of Ethiopia include: *Olea welwetschii*, *Schefflera abyssinica*, *Pouteria adolfi-friederici*, *Prunus africana*, *Cordia africana*, *Macaranga capensis*, *Elaeodendron buchananii*, *Ilex mitis*, *Sapium ellipticum*, *Ekebergia capensis* and others.

The transitional rainforests are known from the south-western part of Ethiopia in Wallega, Illubabour and Keffa. They occur in areas where altitude ranges between 500 and 1500 m a.s.l., the mean annual temperature ranges from 20 to 25°C and the annual rainfall is about 2000 mm. Rainfall occurs all year round (Eklundh 1996; EMSA 1996; Asres 1996). The transitional rainforest is similar in physiognomy and composition to the moist Afromontane forest described above, with additional species from the lowland Guineo-Congolian. Because of their close similarities, some classification systems merge the transitional rainforest with that of the moist Afromontane forest type. Characteristic tree species include: *Pouteria atissima*, *Anthocleista schweinfurthii*, *Celtis philippensis*, *C. zenkeri*, *Eugenia bukobensis*, *Garcinia huillensis*, *Manilkara butugi*, *Morus mesozygia*, *Strychnos mitis*, *Trichilia dregeana* and *Trilepisium madascariense*.

Table 3: Some characteristic species and state of human disturbance in natural forest vegetation of Ethiopia

i) Dry evergreen montane forest

Location and distribution: From 1500 to 3400 m a.s.l. in the central, eastern, southeastern and northern highlands.

Characteristic species: *Juniperus procera*, *Afrocarpus falcatus*, *Prunus africana*, *Ekebergia capensis*, *Olea spp.*, *Apodytes dimidiata*, *Allophylus abyssinica*, *Euphorbia ampliphylla*, *Olinia rochetiana*, *Myrsine melanophloeos*, *Dovyalis abyssinica*, *Myrsine africana*, *Calpurnia aurea*

Extent of human disturbance: The most extensively inhabited vegetation zone in Ethiopia, where crop cultivation and grazing is widespread; forests have significantly diminished.

ii) Moist evergreen montane forest

Location and distribution: The typical high forest (tropical) type found in the southwestern parts of the country, which are the wettest, and southern slopes of the Bale Mountains; contains the most important timber species of the country.

Characteristic species: *Pouteria adolfi-friederici*, *Pouteria altissima*, *Olea capensis*, *Croton macrostachyus*, *Afrocarpus falcatus* (in the southeast moist forest), *Albizia schimperiana*, *Cordia africana*, *Mimosops kummel*, *Wahlenbergia capensis*, *Schefflera abyssinica* and others. Natural coffee is one of the characteristic species in the understory. Epiphytes are very common and include *Peperomia tetraphylla*, *Asplenium sandersonii*, *Loxogramme lanceolata*, *Aerangis luteoalba*, *Arthropteris monocarpa*, and *Asplenium aethiopicum*.

Extent of human disturbance: Previously inaccessible except by the local people, the moist forest was little affected by modern developments. However, since the 1970s, its rich timber resources have been heavily exploited, there have been extensive settlements from drought prone areas of the country, and many other commercial activities have attracted a huge human influx. It is now under severe threat from over logging as well as conversion into tea and other commercial plantations.

iii) Combretum–Terminalia (broad-leaved) deciduous woodland; lowland dry forest

Location and distribution: Between 500 and 1800 m a.s.l., confined to western, northwestern and parts of southwestern lowlands.

Characteristic species: *Boswellia papyrifera*, *Terminalia laxiflora*, *Acacia polycantha*, *Grewia spp.*, *Stereospermum kunthianum*, *Sterculia setigera*, *Oxytenanthera abyssinica*, *Balanites aegyptiaca*, *Annona senegalensis*, *Acacia senegal*, *Acacia seyal*, *Combretum adenogonium*, *Combretum collinum*, *Combretum molle*

Extent of human disturbance: Human influence is growing with settlements, mechanized crop cultivation (particularly sesame) and overgrazing are becoming threats to the vegetation.



iv) Lowland dry evergreen forest

Location and distribution: A special type of forest found only in the Gambella Region and adjacent parts of southern Sudan between 450 and 600 m a.s.l.

Characteristic species: *Acalpha neptunica*, *Alstonia boonei*, *Baphia abyssinica*, *Celtis gomphophylla*, *Celtis toka*, *Milicia excelsa*, *Mimulopsis solmsii*, *Xylopa parviflora*, *Combretum spp.*, *Terminalia spp.*

Extent of human disturbance: Previous threats were mostly from settled refugees and refugee camps, but now expanding due to dams, large-scale farming and discovery of oil.

v) Acacia-Commiphora woodlands

Location and distribution: Between 900 and 1900 m a.s.l., found in the southern and central Rift Valley, and eastern and southeastern lowland.

Characteristic species: *Acacia seyal*, *Acacia albida*, *Acacia senegal*, *Acacia etbaica*, *Acacia mellifera*, *Acacia drepanolobium*, and other *Acacia spp.*, *Balanites aegyptiaca*, *Commiphora africana*, *Commiphora myrrha*, and other *Commiphora spp.*, 4 *Boswellia spp.*, *Moringa spp.* many of which are regionally restricted endemics.

Extent of human disturbance: Traditionally occupied by pastoralists and agro-pastoralists, but the woodlands in the Rift Valley are being affected by cropland expansion, overgrazing, drought and unsustainable fuelwood harvest and charcoal making.

v) Acacia-Commiphora woodlands

Location and distribution: Occur in few areas in western Ethiopia between 500 and 1500 m a.s.l. They are sandwiched between the lowland dry forest and moist Afromontane forest in some areas or between Combretum-Terminallia and moist Afromontane forest in other areas.

Characteristic species: The transitional rainforest is similar in physiognomy and composition to the Afromontane rainforest described above, with additional species from the lowland Guineo-Congolian forest described above. Species include: *Pouteria atissima*, *Anthocleista schweinfurthii*, *Celtis philippensis*, *C. zenkeri*, *Eugenia bukobensis*, *Garcinia huillensis*, *Manilkara butugi*, *Morus mesozygia*, *Strychnos mitis*, *Trichilia dregeana* and *Trilepisium madascariense*.

Extent of human disturbance: Like the moist Afromontane forest, this forest has been recently exposed to heavy anthropogenic disturbances. Until recently it has been inhabited by indigenous people that employ low input and output shifting cultivation practices, including root crops. However, in recent years they have been selectively logged and also deforested to give way to other land uses.

Lowland dry evergreen forest is a special type of forest vegetation in Ethiopia restricted to the Baro lowlands of Gambella. The forest occurs within the altitudinal range of 450-600 m a.s.l. and is characterized by a mean annual temperature of maximum 35°C, and minimum 19°C and annual rainfall ranging from 1300 to 1800 mm. The forest occurs mainly on sandy soils, which are well drained, and is semi-deciduous, with a 15-20 m tall continuous canopy of *Baphia abyssinica* (endemic to SW Ethiopia and adjacent areas of the Sudan) (Senbeta 2006). Major forest tree species are *Baphia abyssinica*, *Celtis toka*, *Diospyros abyssinica*, *Lecaniodiscus fraxinifolius*, *Pouteria alnifolia*, *Zanha golungensis*, *Alstonia boonei*, *Antiaris toxicaria*, *Melicia excelsa*, *Celtis gomphophylla*, and *Zanthoxylum leprieurii*.



Combretum-Terminalia woodlands occur in the relatively wetter drylands of northwestern, western and southwestern parts of the country including in the river gorges of Abay, Tekeze, Anger-Didessa, and Baro. Small areas of the vegetation are also recognized from the Dakota Valley between Harar and Jijiga in the east. In western and northwestern lowlands, the vegetation occupies the altitudinal range between 400 and 1900 m a.s.l. Typical woody plant species in this forest vegetation type include *Boswellia papyrifera* (the frankincense tree), *Lannea sp.*, *Terminalia schimperiana*, and *Anogeisus leiocarpa*; *Combretum hartmannianum*, and *Acacia sp.*; *Sterculia africana*, and *Ziziphus abyssinica*. Frankincense produced from *Boswellia papyrifera* is an import export forest product of Ethiopia (Lemenih and Kassa 2011).

Some of the *Acacia-Commiphora* woodlands also meet the forest definition of Ethiopia, and are therefore considered as forest resources. These vegetation types are located in drier climatic conditions. They cover a vast stretch of land in the east, south, northeast, southeast and across the Rift Valley. The characteristic plant species of this vegetation types, although variable from area to area, are mostly drought tolerant small-leaved trees and shrubs. Some of the conspicuous species are *Acacia tortilis*, *A. seyal*, *A. senegal*, *A. etbaica*, *A. sibiriana*, *A. mellifera*, *A. drepanolobium*, *Commiphora africana*, *C. myrrha*, and *C. fluviflor*. Despite their low stature, *Acacia-Commiphora* forest vegetation hosts high levels of endemic plants in the genus *Acacia*, *Commiphora* and *Boswellia*. They host some of the economically important NTFPs (gums and incenses) of the country. *A. senegal*, *A. seyal* and several *Commiphora* and *Boswellia* species with commercial gums and incense occur in this vegetation type (Lemenih and Kassa 2011).

4.2 The forest resource base

There is a lack of consistent and reliable data on the areal coverage, standing stock, growth rate, production and productivity of forest resources in Ethiopia. Estimates from different sources vary considerably. This is partly attributed to the varied definitions of forest applied. The high rate of deforestation combined with on-going restoration/rehabilitation further complicates this as estimates become rapidly outdated.

Current forest cover estimates, including bamboo, are presented in Table 4. Ethiopia has close to 17.35 million ha (15.7% of the country area) of forest resources, including bamboo, dense woodland, natural forests, and planted forests. Plantation forest also comprises public industrial plantations and private woodlots.

Most of the natural forests exist in the south-western and south-eastern parts of the country (Figure 3). Oromia, Gambella, SNNPR, Amhara and Benishangul are regional states that have most of the natural forest resources, while Oromia, SNNPR and Amhara and Tigray have most of the industrial plantations and woodlots. Oromia, Amhara and SNNPR have the largest commercial plantations. Amhara also has the largest woodlots. Oromia, SNNPR and Amhara together contain approximately 93.5% of the total plantation resources in the country.

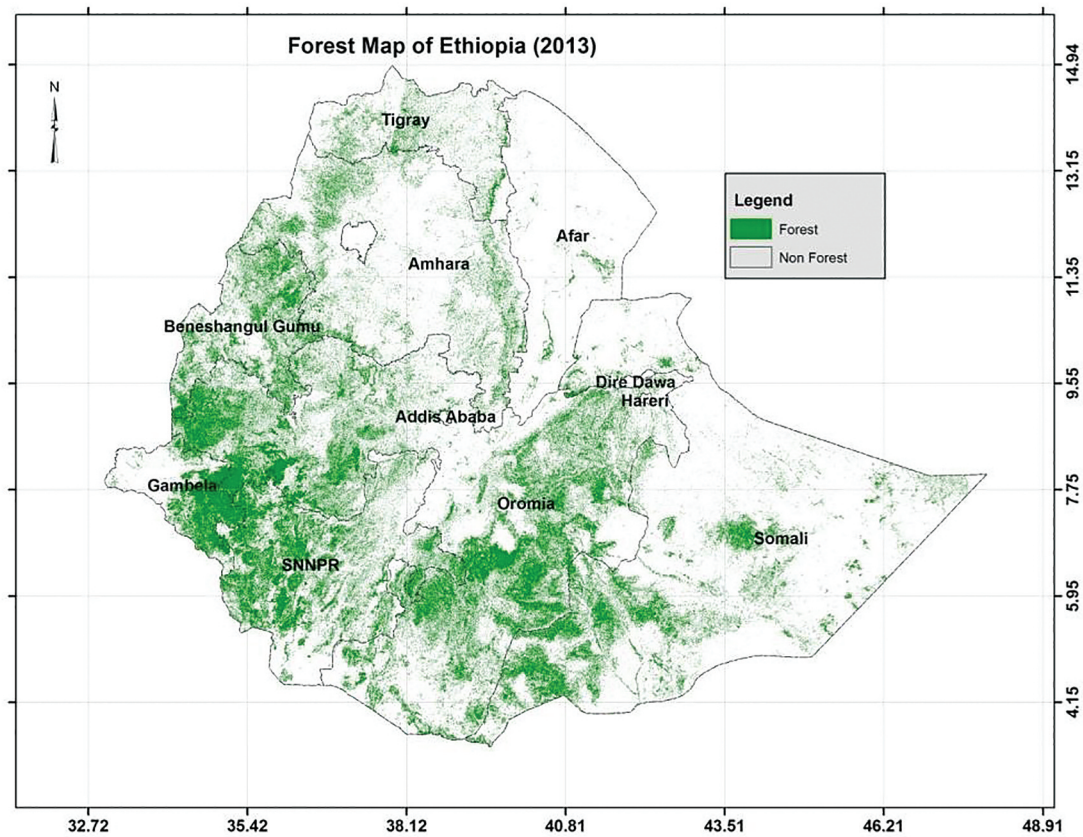


Table 4: Estimates of area cover of various forest resources in Ethiopia

Forest types	Area (ha)
Bamboo	519,124
Dense Woodland	10,739,286
Natural Forest	5,266,419
Plantation	827,613
Total	17,352,443

Source: MEFCC

Figure 3: Distribution of the forest resources of Ethiopia (Source: EMA 2013)



4.2.1 Bamboo forest

Bamboo is an important forest resource of Ethiopia with high potential to contribute to forest sector development. The total bamboo forest area in Ethiopia is estimated as 519,124 ha (Table 5). Two species of bamboo are known to exist in the country: *Arundinaria alpina* (also known as highland bamboo) and *Oxytenanthera abyssinica* (also known as lowland bamboo). The majority of Ethiopia's bamboo resources are naturally grown. A small amount, mainly the highland bamboo, is also planted by farm households as bamboo woodlots.

Table 5: Mapped areas of bamboo by region

Region	Area (hectares)
SNNPR	22,321
Benishangul Gumuz	462,650
Oromia	34,153
Total	519,124

Source: MEFCC

Bamboo is an important Non-Timber Forest Product (NTFP) in Ethiopia contributing to local livelihoods. It provides an important source of raw material for a number of small and micro forest based enterprises. In recent years there has been an increase in bamboo business investment in Ethiopia. In rural areas, bamboo is extensively used in traditional construction with applications including fencing, roofing and making household furniture. Its fast growing nature, large biomass production and other attributes make it a versatile resource for wood-based industries.

However, it is likely that the Ethiopian bamboo area is shrinking as a result of deforestation and following the recent gregarious flowering of both lowland and highland bamboos in many places. Main drivers are clearance for farm and settlement expansion due to population growth including the resettlement programs that translocated large households from highlands into bamboo forests in the lowlands of Benishangul, Oromia and Amhara regions. Expanding investments in agri-business is another driver of bamboo loss. A recent massive gregarious flowering of both highland and lowland bamboo also contributed to the decline of the resource. Management of the bamboo resource is needed, including the use of modern technologies for propagation, fertilizing and genetic improvement.

4.2.2 Natural forest management

Forests in Ethiopia in general, both natural and planted, have suffered from the lack of proper management. The natural forests in particular have been exploited unsustainably, and those standing today are not productive for commercial management. Plantation stands are also of poor quality due to lack of proper silviculture.



The dominant view on the natural forests has been their preservation for biodiversity conservation. However, for reasons described in section 8.1, natural forests have not been properly protected and conserved for biodiversity. At the same time, natural forests have not been managed to become a good source of commercial forest products for the country's rising demand for wood products and increasing dependence on importation.

Poor regeneration is a major problem in most of the natural forest stands (Lemenih and Woldmariam 2010). Overgrazing, excessive harvest for fuelwood, and illegal logging negatively affect regeneration. Past logging and on-going selective illegal pit-sawing of important timber species (such as *Cordia africana*, *Hagenia abyssinica*, *Afrocarpus falcatus*) has degraded the quality and altered the structure of the remnant natural forests (dry and moist Afromontane forests). In most of the forests, over 75% of the stem density is dominated by pioneer species that are less commercially attractive (Abate 2004; Lemenih and Bongers 2011). These problems call for efforts to improve management of the forests to enhance their productivity and production including for biodiversity and carbon stock.

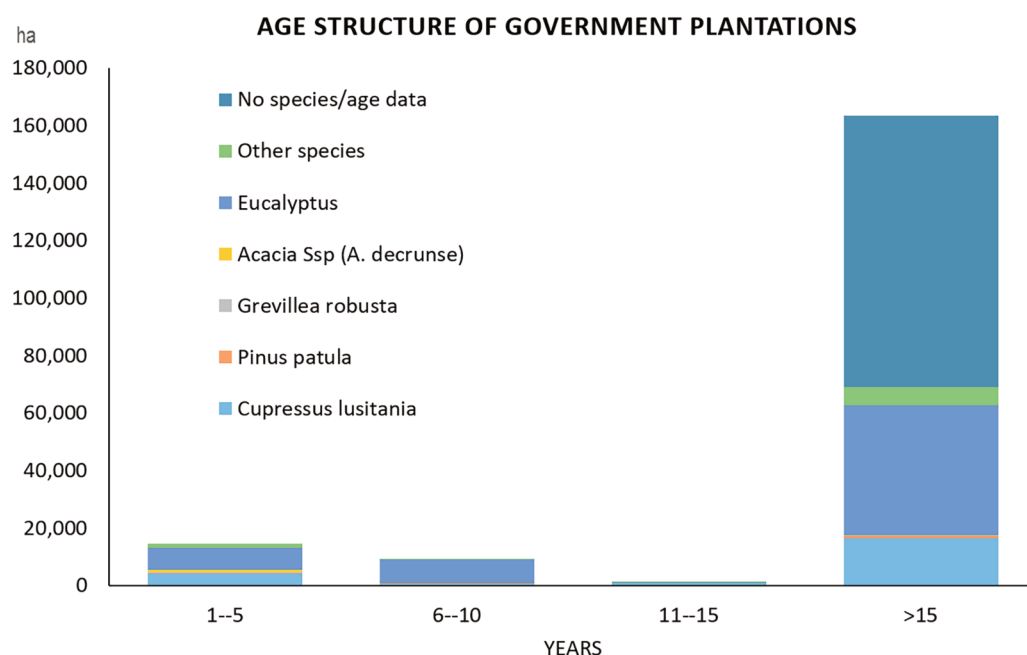
4.2.3 Planted forests

Ethiopia has engaged in plantation development for over 100 years (Lemenih and Kassa 2014). Tree plantations are comprised of three sub-types: commercial/industrial plantation, wood-lots, and peri-urban plantation (mainly for fuelwood). The plantation forests in Ethiopia are comprised mainly of exotic tree species. With the decline and subsequent banning of industrial wood production from natural forests combined with growing demand for wood products, the importance of plantation forests is increasing.

Industrial plantations, which were established during the 1970s and 1980s are over-mature (Figure 4). There are two problems associated with this skewed age class distribution. First there will be a serious production gap and drop in wood supply from industrial plantations when the mature stands are harvested. Second the quality of wood from the stand is deteriorating from rotting due to over-aging and repeated coppicing, making many stands not suitable for industrial applications.

The total area of plantation forests in Ethiopia was estimated recently as 0.83 million ha.

Table 6, while a more field based estimate reveals a figure around one million hectares. About a fifth of the plantation estate in the country is owned publicly by the State through its regional forest enterprises or regional governments. The bulk of plantation resources are owned by private farm households and communities (Table 7). These are mainly in the form of woodlots dominated by eucalyptus species. Private woodlots are rapidly expanding in rural Ethiopia. There is significant contribution from the woodlots to annual wood production. After natural forest, they are the major sources of domestic wood production, particularly wood consumed in the construction and furniture sub-sectors.

Figure 4: Age class distribution of existing commercial plantations in Ethiopia

Source: Data from regional forest enterprises and agencies.

Note: The graph excludes woodlots that are usually managed on a short rotation cycle of 5-8 years.

A characteristic feature of most commercial plantations is their poor quality and low productivity due to poor silvicultural management (Bekele 2011). Proper and regular thinning and pruning are not conducted. Some of the plantations were established on degraded and unsuitable lands. Further, most plantations were established at the buffer zone of natural forests, with the aim of serving two purposes: providing industrial round wood and reducing pressure on natural forests (Bekele 2011).

On another scale, private woodlots are fast spreading in rural landscapes across the highlands of Ethiopia (Lemenih and Kassa 2014). Farmers are actively planting trees in small areas mostly on degraded farm and grazing lands. These small individual woodlots add up to thousands of hectares. Often termed non-industrial plantations, smallholder woodlots are the main suppliers of poles for electricity and scaffolding and contribute a significant share of the biomass fuel consumed nationally (Lemenih and Kassa 2014).

Species wise, eucalyptus dominates the current plantation forests, covering more than 90%. Cupressus contributes 3.3% and other species cover a small fraction of the standing stock (Figure 6).

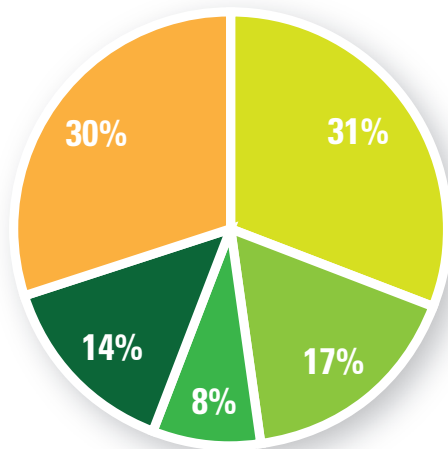
**Table 6: Forest plantation of Ethiopia by ownership and species**

Regional state	Public/state owned (ha)	Private/community (ha)	Total (ha)	Area by species (ha)						
				Eucalyptus	Cupressus	Grevillea	Pinus	Acacia decrease	Euc+Cup mixed	Others
Oromia	57,739	27,800	85,539	56,082	15,898	472	1,217	64	0	1,032
Amhara	32,093	639,400	671,493	653,260	5,809	432	0	593	5,699	5,699
Tigray	15,000	23,700	38,700	38,700	0	0	0	0	0	0
Addis Ababa	27,000	0	27,000	27,000	0	0	0	0	0	0
SNNPR	57,201	124,157	181,358	152,757	11,440	2,860	1,430	0	5,720	7,150

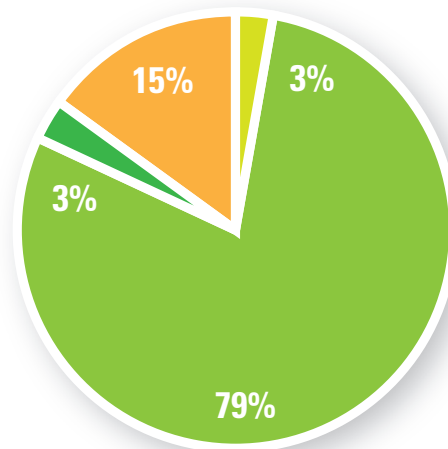
Source: Regional forest enterprises and forestry agencies.

Figure 5: Relative distribution by regional state of public industrial plantation and private woodlots in Ethiopia

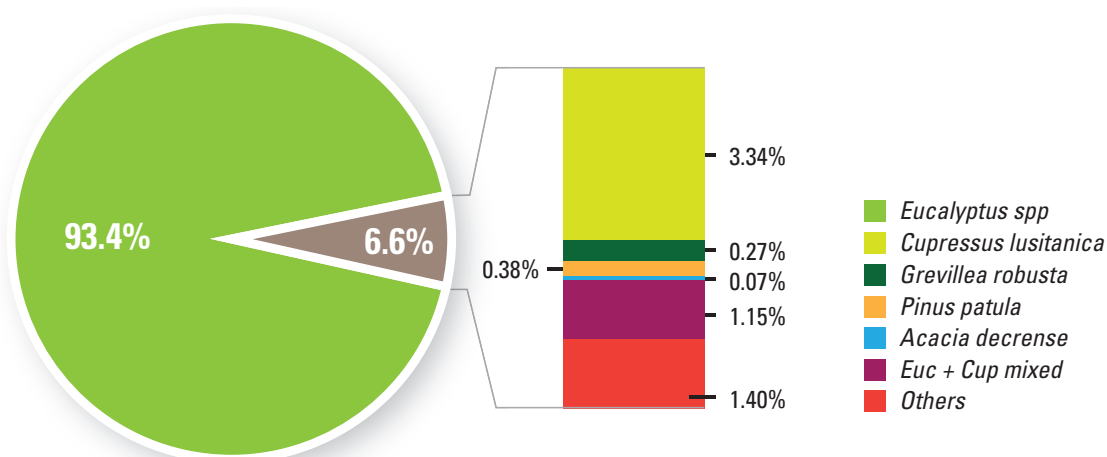
Relative distribution by region of public owned plantation forest



Relative distribution by region of public owned plantation forest



■ Oromia
 ■ Amhara
 ■ Tigray
 ■ Addis Ababa
 ■ SNNPR

Figure 6: Species composition of public and private/community plantation forests

4.3 Demand and supply gaps for forest products

Standing stock: Growth and standing stock in Ethiopia's current forest vegetation is presented in Table 7. Actual incremental yield for the various forest vegetation is very low, and for the natural forest this is mainly due to over logging in the past and lack of proper management for the remaining forest. For the plantation forest, the main reason is the lack of proper silviculture and stand management. The current estimated 12.5 m³/yr/ha MAI for the industrial plantation is low compared to the potential growth of around 46 m³/ha/yr for Eucalyptus stands and 33 m³/ha/yr growth of conifer stands when planted and managed on good sites.

Table 7: Growth and standing stock of forests of Ethiopia

Parameters	Forest vegetation		
	Natural forest	Plantation (industrial)	Plantation (woodlots)
Standing stock (m ³ /ha)	48.73*	179	75
Total standing volume (m ³)	779,958,000	33,836,907	61,129,275
Mean Annual Increment (MAI) (m ³ /yr/ha)	2.01*	12.5	15
Annual sustainable yield (m ³ /year)	32,171,470	2,362,913	12,225,855

Source: WBISPP, 2004 & FSR, 2015

*Note: These estimates are adjusted by means of weighted average from the data by WBISPP (2004) for high forest and woodlands. The natural forest calculations exclude bamboo forest. The larger share of the natural forest defined today is woodlands, and adjustment of the standing stock and MAI is needed to arrive at a realistic sustainable yield and total standing stock.

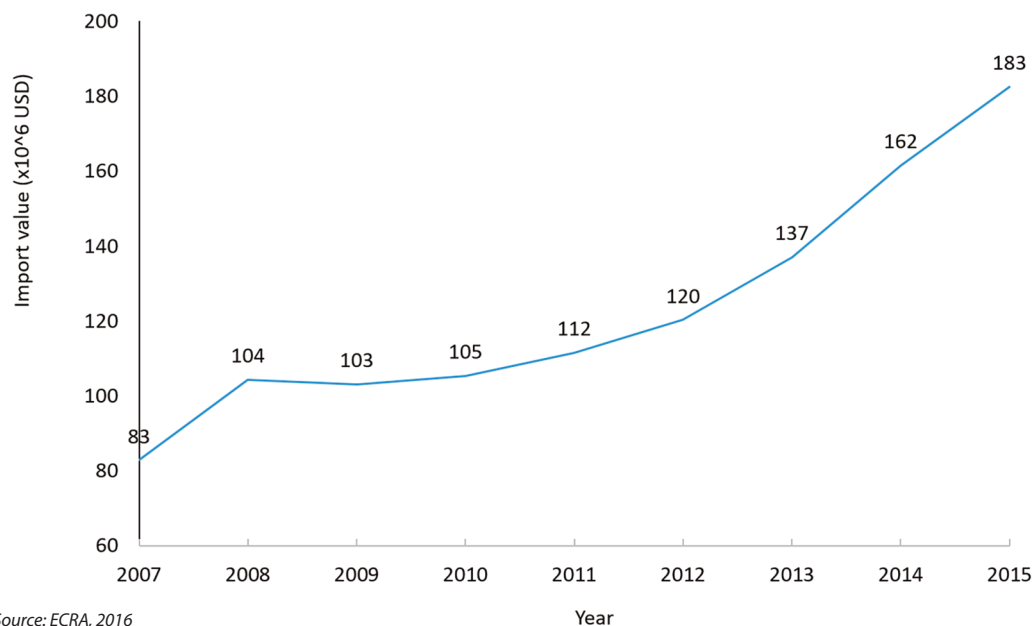


Demand and supply: Wood product demand is growing fast in Ethiopia due to population and economic growth. The construction sector boom, growth in urbanization and urban population, and growing middle class is driving a rapid increase in demand for wood and other forest products (FSR 2015). The total wood product demand in 2015, measured by the volume of wood consumed in the country (production+import-export) is approximately 130.3 million m³ RWE. Approximately 92.3% of this is in the form of wood fuel and the rest is in the form of industrial wood.

Ethiopia's wood and other forest products supply comes from domestic production and import. In 2015 alone, Ethiopia imported 3.006 million m³ RWE of various industrial wood products worth approximately USD 182.53 million, and the importation trend is increasing. In fact, it more than doubled between 2007 and 2015 (Figure 7). The increasing dependence on import is a matter of serious concern for the forest sector in Ethiopia.

At the national level, there is a huge gap between demand and domestic sustainably produced supply of wood products (WBISPP, 2004; FSR, 2015). This has triggered two economically unfavorable outcomes. First, it is driving unsustainable extraction of wood from the natural forests, and hence the degradation and loss of biodiversity. Second, this forces the country to depend heavily on imported wood products for its wood-based industries. Unless actions are taken swiftly, the situation will drive further degradation of the natural stands and affect the economic growth of the country through competition for the scarce hard currency for importation of wood.

Figure 7: Trend in industrial wood import bill (in USD) for wood-based products in Ethiopia



Wood fuel demand and production: The largest source of wood-based production and consumption in Ethiopia is wood fuel (firewood and charcoal). According to the outdated WBISPP (2004), more than 97.5% of the energy consumed by rural and urban households in Ethiopia during the 1990s and early 2000s is derived from biomass fuel, and 78.9% of biomass fuels are in the form of firewood and charcoal.⁵ Based on the FSR (2015), the annual volume of wood harvested for wood fuel is approximately 120.4 million m³ roundwood equivalent (RWE) in 2015 (115.024 million m³ as firewood and 5.408 million m³ for conversion into charcoal).

Wood fuel is produced from natural forests (natural high forests, woodlands and area exclosures) and plantations (industrial and woodlots) (Table 8). There is also a small volume of wood fuel sourced from wood waste and import. The imported wood fuel is mostly for industrial uses. The largest portion of wood fuel is sourced from natural forests and woodlands.

Table 8: Estimate of wood fuel supply in Ethiopia

Forest type	Estimated annual supply of fuelwood in RWE (x106 m ³)	Proportion
Woodlots	6.6	5.48%
Natural forests and woodlands (sustainable supply)	32.1	27.05%
Peri-urban energy plantations	0.08	0.07%
Public plantations	0.07	0.06%
Area exclosures	1.64	1.36%
Woodfuel from waste	0.17	0.14%
Import	0.000279	0.00%
Unknown source	79.74	65.84%
Total	120.33	100%

Source: Adjusted from FSR, 2015, Note 79.34 million m³ described as 'unknown source' is most likely the volume extracted from natural plantation forests through unsustainable harvest.

The sustainable supply of wood fuel from natural forests and woodlands is only 32.1 million m³ RWE. The remaining 79.74 million m³ RWE of fuelwood is sourced from unsustainable extraction in forests and woodlands, explaining Ethiopia's widespread degradation and deforestation. This is the volume that shows a sustainable supply gap for the volume of fuelwood needed today. The GDP contribution of wood fuel annually consumed is estimated at USD 5,858 million (MEFCC 2016).

⁵ More recent studies show that nearly 95 percent of the nation's energy consumption comes from biomass fuels – of which wood fuel is the most important, providing an estimated 68% of the total (FDRE 2015).



Industrial wood demand and supply: Various industrial wood products are produced, imported, exported and consumed in Ethiopia. The main categories include: construction wood, woods for furniture (including joineries and carpentry), paper and paper products. Products include sawn wood, wood pulp, wood for furniture making including in joineries and carpentries, plywood, veneer wood, treated and untreated poles for utility uses, particle boards, Medium-Density Fiberboard (MDF), shuttering, sleepers, paper and paperboards, wooden tools and wooden furnishings.

The demand for wood for the construction and furniture sub-sectors in 2015 is estimated to be approximately 8.01 million m³ RWE. Including pulp and paper and utility poles, the total demand was close to approximately 8.4 million m³ RWE (Table 9). Slightly greater than one-third of the demand has been supplied through import, meaning nearly two-thirds is supplied from domestic production.

Table 9: Industrial wood demand and supply in 2015

Sub-sector	Demand	Supply sources in RWE (m ³)		
		Production*	Import**	Export**
Construction	7,000,000	4,443,757	2,578,826	22,584
Furniture	1,011,866	945,548	69,996	3,678
Utility poles	40,000	40,000	0	0
Paper	357,585	0	357,585	0
Total	8,409,451	5,429,305	3,006,407	26,262

* Data collected from various sources including OFWE, AFE.

** Data obtained from ERCA2016, the export is reducing the available supply.

Domestic production of industrial wood comes from planted forests (industrial plantations and woodlots) and natural forests (Table 10). Although production from natural forest has long been banned, a significant amount of illegal wood production continues to take place throughout the country. In 2015, domestic industrial wood production was estimated to be approximately 5.43 million m³. The FSR (2015) estimated total domestic production of industrial wood at approximately 7.4 million m³ RWE in 2013. The bulk of this wood production comes from woodlots in the form of poles, used in both traditional and modern construction.

Ethiopia wood exports are very small in volume, only about 1.45% of the total imported volume. The largest industrial wood consumed in the country is construction wood, followed by wood for furniture.

Table 10: Domestic industrial wood production in Ethiopia in 2013

Supply (m³ RWE)	Construction wood	Furniture	Paper and wood pulp	Utility pole	Total
Woodlot	4,336,579		0	0	4,336,579
Industrial plantations	107,178	332,000	0	40,000	479,178
Unknown source	0	613,548	0	0	613,548
Total	4,443,757	945,548	0	40,000	5,429,305

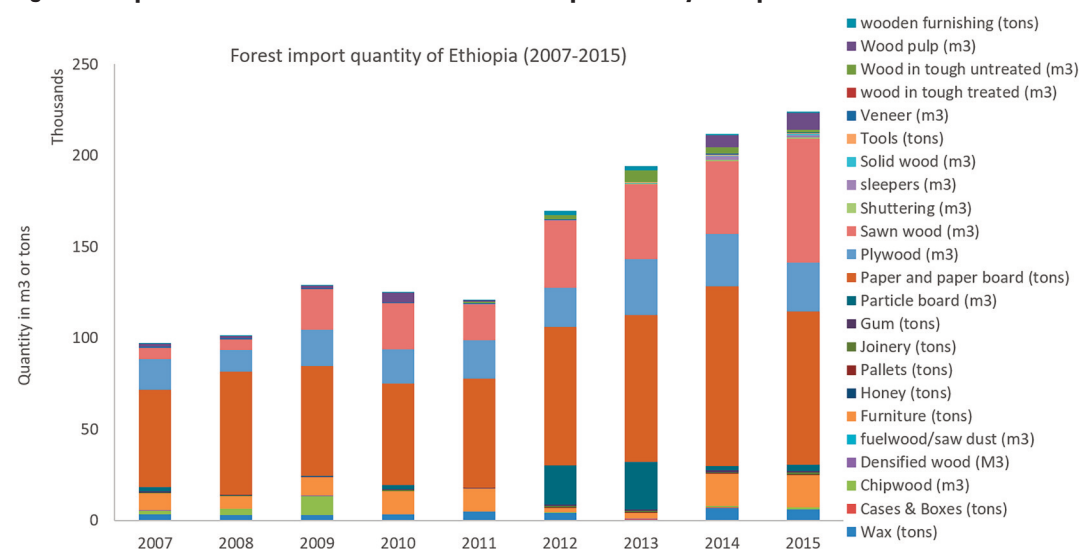
Source: FSR 2015

Overall, this demand and supply analysis shows 0.79 million m³ of wood is supplied from unknown sources, most likely from unsustainable exploitation of natural forest. The gap in wood product supply from sustainable production (including demand for wood fuel) is approximately 80 million m³ for 2015. This volume may reflect the illegal and unsustainable wood production from forest and woodland used mainly for fuelwood and some for furniture.

4.4 Forest products import and export balance

Ethiopia's export of forest products is mainly limited to NTFPs- principally beeswax, honey and natural gum.

Wood product import-export: Ethiopia imports a huge volume of industrial wood, and the quantity of imports is growing (Figure 8). Ethiopia imported an average of 65,680 m³/year of various industrial wood products during the 2007-2015 period. Sawn wood is the largest imported volume, averaging 29,285 m³/year, followed by plywood (21,936 m³/yr.) and particle board (6,554 m³/yr.).

Figure 8: Import volume of selected industrial wood products by Ethiopia

Source: ECRA2016



Imports include a significant amount of higher quantity, or value-added (manufactured) wood products such as furniture, paper and paper boards, wooden tools, joinery and carpentry products, boxes and cases and wooden furnishing. The average import weight of these products is 82,251 tons/year for the 2007-2015 period (Figure 9). The largest import in this category is paper and paper board with the average of 70,403 tons/yr., followed by 10,186 tons/yr. of furniture.

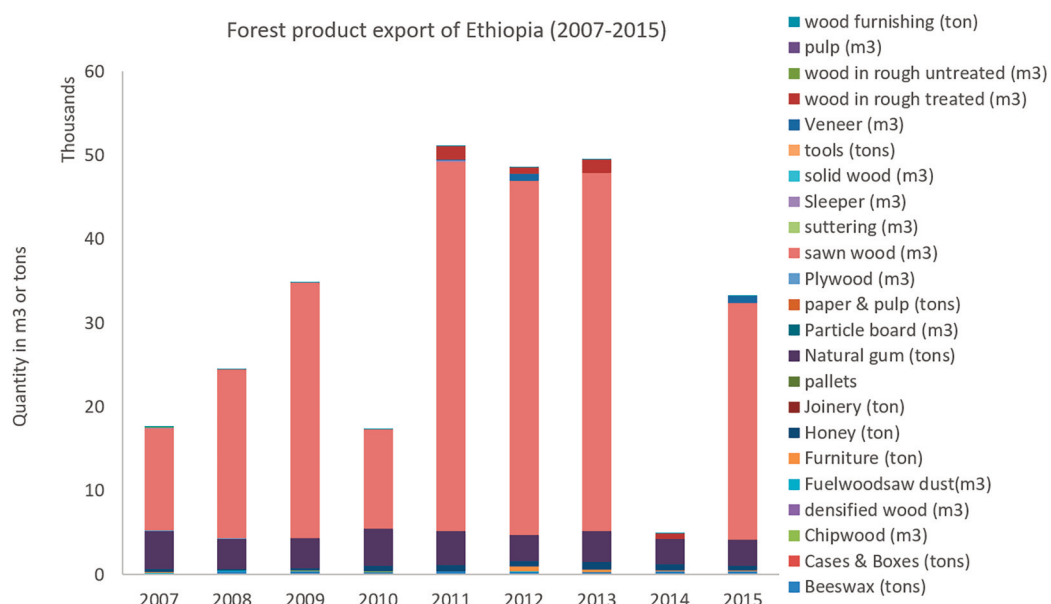
Figure 9: Import weight of various manufactured products (furniture, wooden tools etc.)



Source: ECRA 2016

The average value of wood import amounts to approximately USD 123,898,000/yr. for the 2007-2015 period. The import bill is rapidly increasing over time. The products with the highest import value in decreasing order are: paper and paper board (USD 68,311,000/yr.); furniture (USD 19,205,000/yr.); sawn wood (USD 13,333,000/yr.) and plywood (USD 10,593,000/yr.). Together, these are valued at over USD 100 million average annual import value since 2007. Major countries of origin or consignment for woods and wood products imported to Ethiopia are Austria, China, UAE, India, Turkey, Germany and Sweden.

Ethiopia exports small quantities of various wood products. Poles (536 m³/yr.), veneer (437 m³/yr.), sawn wood (28,982 m³/yr.), furniture (98 tons/yr.), fuelwood/charcoal (56 m³/yr.) and chipwood (21 m³/yr.) are the main exports (Figure 10). Sawn wood is the product of high volume and value in terms of export. The main destination is Sudan and Middle Eastern countries.

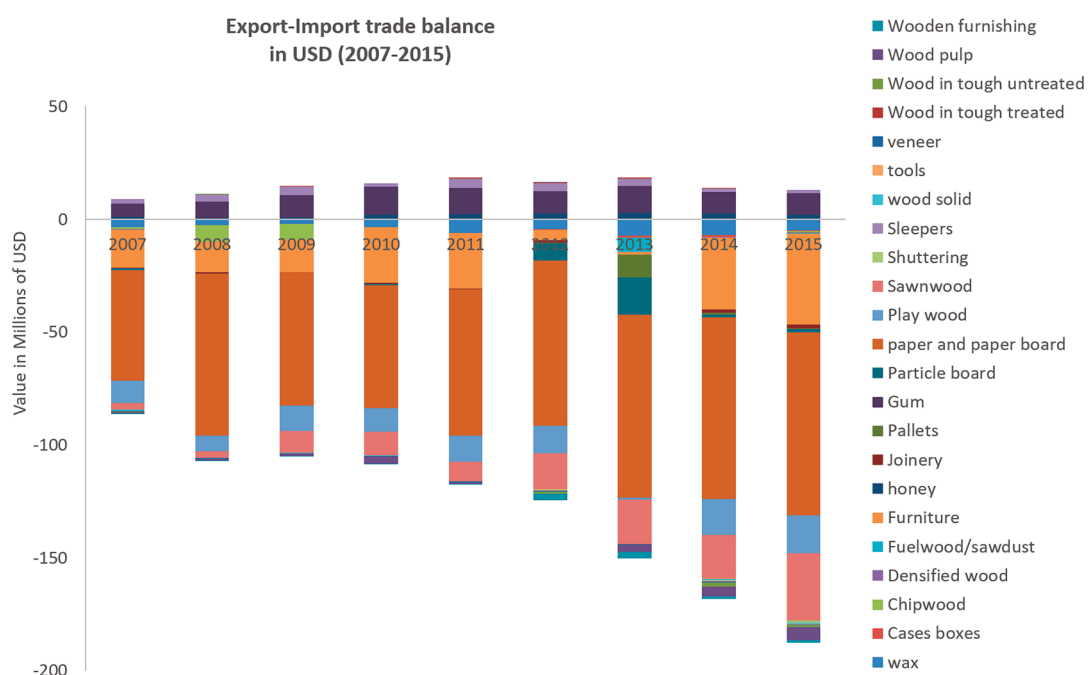
Figure 10: Forest product export of Ethiopia 2007-2015

Source: ECRA 2016

A comparison of import and exports shows a negative trade balance, with a total volume of nearly 120,000 m³ RWE import and about 35,000 m³ RWE export; a net import balance of 3,079,074 m³ RWE. Figure 11 shows value based trade balance (import-export) for forest products (wood and non-wood included) for the 2007-2015 period. As shown in Figure 11, Ethiopia's import bill is hugely greater than the export revenue leading to a large negative trade balance. The negative trade balance doubled from -77,096,160 USD in 2007 to -174,537,053 USD in 2015.

To substitute the current import and unsustainable production, significant investment is needed in forest resources development. The amount spent on imports could be invested in resource development and processing.

Figure 11: Trade balance (Import-export) of wood products in Ethiopia for the period 2007-2015



4.5 Status and opportunities for wood-based industry development

The growing gap between timber supply and demand should be supplied from sustainably managed domestically grown forest resources, combined with investments in manufacturing. Significant investment is needed to establish plantations and improve the management and productivity of the natural forests.

Including the imported volume of wood, which is 3.124 million m³ RWE, about 83.124 million m³ RWE is needed to ensure a properly and sustainably operating forest sector in Ethiopia. The FSR (2015) estimated 4.4 million m³ gap of supply in the coming 20 years (2033), excluding fuelwood. This is translated to 310,000 ha of new well-managed forest stand. Ethiopia has excellent biophysically suitable land for forest growth and domestic supply of wood material. The fast growth in demand should stimulate investment in the resource base development domestically through appropriate investment incentives for the forest sector.

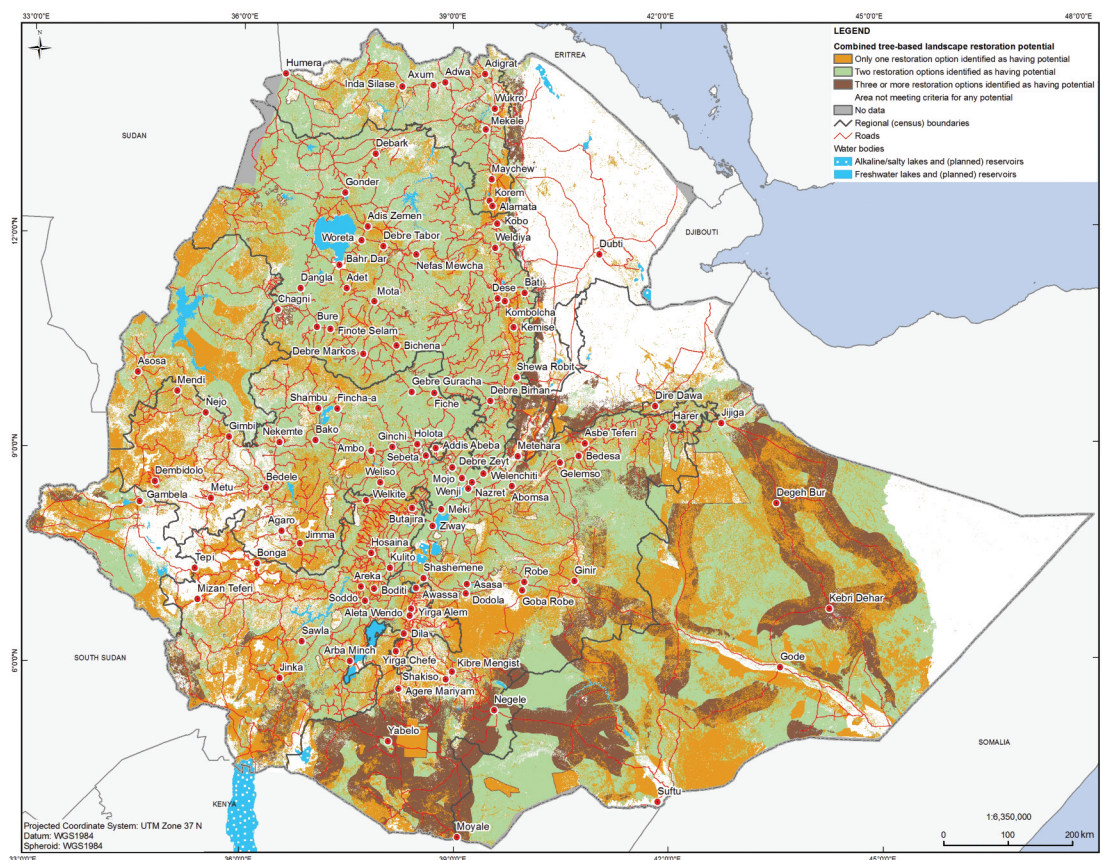


Forest product demand is growing fast in Ethiopia. The FSR (2015) predicted an increase in demand for furniture close to 400% in 2033, while another similar study predicted a demand growth of 477% for industrial woods by 2040 (INDUFOR, 2016- unpublished). In view of the demand and market outlook for forest products, there is a need to increase industrial round wood supply through domestic production. Investment in the forest sector provides the opportunity to enhance the contribution of the sector to the national economy and improve economic opportunities in rural areas. Further expansion of the industrial wood supply can benefit from the export opportunities of forest industry products in Eastern and Northern Africa, the Middle-East and India.

Ethiopia's investment to improve infrastructure such as road and railway also helps to increase the profitability of investment in the sector. Further, considering the industry requires large amounts of reliable power, the numerous energy projects currently under construction will soon make these energy requirements available domestically.

A major barrier to recognize in forest resource base development is the availability of land to develop. Rural areas, particularly the productive highlands, are densely occupied by small-holder farmers. Productive land of the size needed to make investment payoff is not available en bloc and conflict-free.

Ethiopia should consider improving the productivity of its poorly managed and degraded landscapes using the vast restoration opportunity in the country (Fig. 12). A nation-wide survey is required to identify the extent and degree of degradation of remaining forests to develop appropriate management strategies. For example, highly degraded natural forests may be converted into very productive and intensively managed plantation forests. Where appropriate, the management of natural forests (those managed both by PFM and government) for productive purpose through selective logging should be considered. Finally, converting some agriculture lands (e.g. those found on moderately steep slopes) back to forestry through the provision of appropriate incentive packages should be considered. These interventions will require significant investment in quality research, education and building of human and institutional capacity.

Figure 12: Overall potential for tree-based landscape restoration

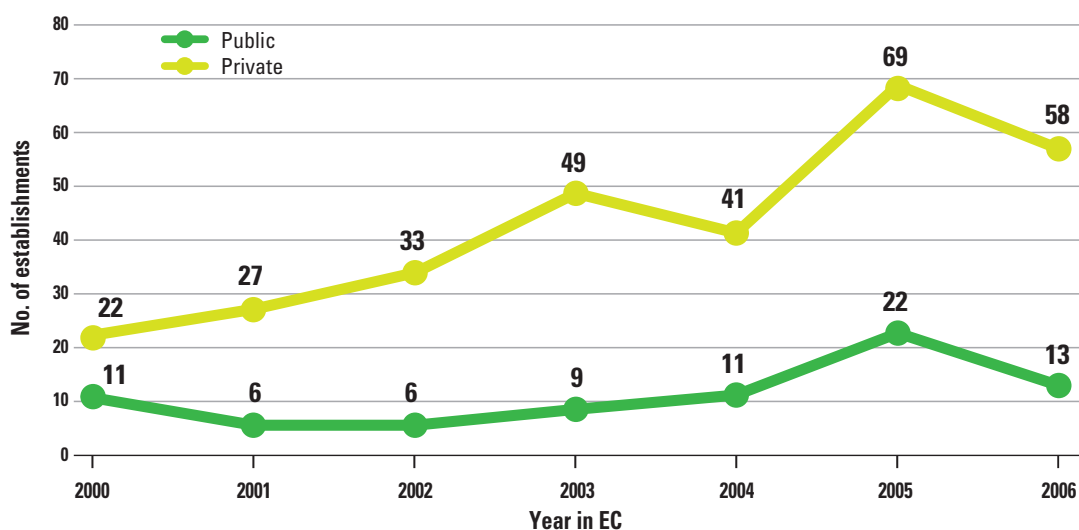
Source: MEFFC/WRI National Potential and Priority Maps for Tree-Based Landscape Restoration in Ethiopia. DRAFT Version 1.0, 30 September 2016.

4.5.1 Forest industry

Forest industries in Ethiopia comprise large, medium and small wood, wood products and paper manufacturing industries. The small and micro wood processing enterprises dominate in terms of number and output. Most large and medium size industries are outdated. Data from CSA (2015) shows that the number of wood-based industries has grown in recent years, particularly those privately owned (Figure 13). In 2015 there were 617 large and medium wood-based enterprises (i.e. those employing more than 10 people) (CSA, 2015).

The largest wood-based industry establishment in the country is furniture manufacturing (CSA, 2015) accounting for 57% of all the large and medium wood-based industries, followed by paper and paper board (24%). The others include manufacture of wood and related products other than furniture. In terms of regional distribution, the largest concentration is in Amhara regional state followed by Addis Ababa and Oromia.

Figure 13: Trend in wood-based industry establishments in Ethiopia (excluding furniture and small scale wood-based joineries and carpentries)



Source: CSA, 2015

The total gross value of production (GVP) in the large and medium wood processing sector in 2015 was 9.5 billion Ethiopian Birr (approximately USD 451 million) (Table 11). This increased by 141 million since 2013. The GVP of forestry industries is estimated at USD 310 million in 2013 (FSR 2015).

Table 11: Gross values of production and value added by large and medium scale wood-based industries in 2015

Industry type	No. of establishment	GVP	All costs including tax	Value added	
				At market price	At basic price
Manufacture of wood and of products of wood	115	718,861	684,739	83,851	34,906
Paper, paper products and printings	151	4,471,993	4,471,993	3,301,512	1,172,552
Furniture	351	4,277,433	3,598,485	1,192,827	680,196
Total	617	9,468,287	8,755,217	4,578,190	1,887,654

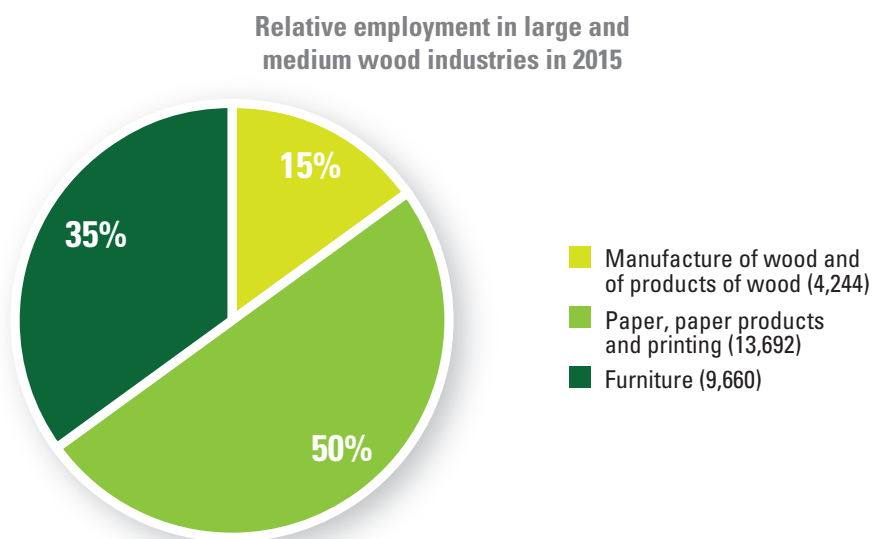
Note: Values are *1000 Ethiopian Birr
Source: CSA, 2015



The value added to the GDP is 219 million USD (4.6 billion ETB) at market price, or 90.5 million USD (1.9 billion ETB) at farm gate price (based on CSA data). The GVP and the value added shows significant disparity. This may be explained by the increasing cost of raw materials and other inputs due to the fact that these are imported with hard currency. Another possibility is the poor efficiency of the production process due to old equipment, weak management and poor performance of labor.

Total number of persons employed in the wood industries is 27,597. The relative employment created by the three major wood-based industries is shown in Figure 14. The paper and paper product sub-sector is the largest in terms of engaging more people, followed by the furniture.

Figure 14: Number of people engaged in large and medium wood-based industries in Ethiopia in 2015



Source: CSA, 2015

Major challenges indicated for the wood-based industries are the scarcity of raw material, energy and finance. The industries require significant quantities of raw material. They have to rely mostly on imported products, which is unreliable. The scarcity of hard currency causes significant delays, which contributes to the industry's poor performance in terms of production.



4.5.2 Wood products value chain in Ethiopia

Ethiopia obtains its wood supply from various sources. Major supplies of commercial wood originate from industrial plantations (owned by state forest enterprises or regional government forestry agencies), private woodlots, natural forests (mainly illegally harvested) and from imports. Imports, industrial plantations and natural forest are the major sources of industrial woods, while woodlots supply the largest portion of construction wood. Utility poles are supplied mainly by industrial plantation and small amounts are from private/community woodlots. State forest enterprises in Oromia and Amhara play important roles in the domestic supply of industrial and utility poles in the country. Natural forest and woodlands supply wood for local construction, fuelwood and illegally produced timber of native species.

The major components of the value chain are presented below:

Forest resources base and wood product supply:

- 0.19 million ha of industrial plantation of mainly Eucalyptus, Cupressus and Pinus. These are the major sources of domestic wood production;
- 0.82 million ha of woodlots of mainly Eucalyptus species. These are the major suppliers of poles or posts for the construction sector and also fuelwood to some degree;
- A degraded natural forest stand with declining supply of timber of native species, principally through informal pit sawing; and
- Importation of industrial wood and wood products.

Log and wood products market and transport:

- Diverse type of uncoordinated harvest, transport and trading of logs, lumber, poles and wood products;
- State enterprises usually follow bid auction of stands and/or lumber they process at their saw miles;
- Private woodlot owners often sell stands or harvested and piled poles individually at bargained prices;
- Harvesting is done manually using either chainsaws (at public enterprises) or with an axe;
- Pit sawn illegally harvested native wood timber is traded unofficially;
- Large volume of lumber, wood panel and finished furniture, joineries pulp and paper products are imported; and
- Transportation is done by hired private trucks or enterprise-owned vehicles.

Primary forest industries:

- Several small and medium size saw mills, publically and/or privately owned, process logs into wood-based panels and lumbers;
- Poles also treated in private and public owned treatment centers; and
- Paper and board are mostly imported. Local output from recycled fiber and all pulp is imported and converted to paper through a few old paper factories.



Value adding and processing (furniture, joinery and others products):

- Furniture and joinery and builders wood work is largely produced by furniture factories (small and large including cottage industries);
- Furniture industry consists of 8,500-9,000 small workshops, about 300 medium-size firms and about 10 large firms (all category firms are very small), including a few FDI entities; and
- Firms exist everywhere in Ethiopia, with concentrations in large cities.

Forest industry products distribution and trade:

- Public sawmill owners sell on basis of public bidding to all types of buyers;
- Wood-based panel producers sell directly to furniture factories and to timber yards;
- Timber yards, mostly small ones, sell to construction and furniture firms and any type of buyer;
- Furniture and joinery is sold directly and via small outlets to construction firms, public and private buyers.

Forest industry product marketing:

- Current structure of the value chain reflects the ongoing evolution process from the public administration to market economy;
- Current consumption levels of forest industry products are low, driven largely by consumption in cities, still affected by a low urbanization rate; and
- Supply side needs to be adjusted to cope with structural change and demand growth.

4.6 Small and micro scale forest enterprise development

A large number of small or micro forest based enterprises operate in Ethiopia, both formally and informally⁶. This includes charcoal venders, pole/post sellers, firewood collectors, herbalists, small wood workshops and joineries, carpentries, lumber retailers, bamboo craftsmen, honey traders, wild spice traders, forest coffee traders and the like.

These enterprises, due to their large number, contribute significantly to the sector's employment. The Government of Ethiopia recognizes this, and developed a support program through the Micro and Small Enterprises (MSE) development framework. In this program, landless youths (male and female) are encouraged to self-organize and engage in small or micro scale business with financial and other support facilitated by the government.

Data obtained from the CSA shows formally established furniture producing small enterprises alone were around 17,693 in 2013, and the number is growing (see Table 12). A recent assessment of small and micro forest based enterprises in Addis Ababa also estimated their number to be about 7,500 — each enterprise employing on average four employees.

⁶ A formal enterprise is a business registered with the appropriate authorities as a legal entity, and perhaps paying tax. Informal enterprises are more or less the opposite of formal enterprises.

Table 12: Small and micro furniture enterprises in Ethiopia (trend and values)

Parameter	Year				
	2002	2006	2008	2011	2013
Gross value of production (Birr)	45,660,874	416,087,286	635,850,091	647,729,821	4,437,175,507
Number of establishment	1,099	5,451	8,575	4,644	17,693
Person engaged	4,275	23,222	34,718	70,975	289,853
Value added (Birr)	19,748,678	127,679,515	277,872,921	282,538,009	1,897,278,931

Source: CSA, 2015- Unpublished data

The gross value of the furniture based small and micro enterprises in 2013 was USD 211,429,000 (4.44 billion ETB), and their value added is USD 84 million (1.9 billion ETB) for the same year. The enterprises also engaged 289,853 workers (CSA 2015).

Most small and medium forest enterprises (SMFEs) are overwhelmingly informal. They operate without formal licenses and registration at the appropriate authority. Those in remote rural towns often depend on wood produced illegally from prohibited resources (natural forest) and endangered species such as *Cordia africana* (Abebe et al. 2009).

A study conducted in six towns around the country (Goba, Arsi Negelle, Adama, Bahir Dar, Mekelle, Hawassa) showed that the ratio of formal to informal enterprises is about 2.26 (Abebe et al. 2009). Applying this ratio to the number of furniture based SMFEs reported by CSA for 2014 will result in the total number of only furniture-based SMFEs to be around 25,509.

Some SMFE sub-sectors are very important economically. These include firewood and charcoal, honey related businesses (including the brewing of tej), construction wood trade, wild spices, bamboo and herbal medicines. The total economic value of fuelwood at the national level is estimated at USD 1.86 billion (39.1 billion ETB) (approximately USD 5.9 billion or 4.5% of GDP) (MEFCC 2016). Of this, USD 1.524 billion (32.0 billion ETB) is estimated to have been in-kind income for households that collect and use their own wood fuel, and the remaining USD 0.34 billion (7.1 billion ETB), represents cash income to households that sell wood fuel products (firewood or charcoal) (MEFCC 2016).

Bamboo is another widely used forest product involved in the SMFEs, mainly where they produce basic household implements and furniture. It is a widely used raw material in many cottage industries, both in urban and rural areas. In 2012/13 bamboo and bamboo product sales contributed USD 1.24 million (26 million ETB). It often generates cash income to households and industries that sell bamboo (MEFCC 2016). This excludes the use of bamboo at household levels. Some 503,000 households generate income (in-kind and cash) from bamboo resource (MEFCC 2016).



There are also small businesses related to herbal medicines, most of which are extracted from forest systems. Approximately 80,000 healers are involved in the trade and administration of such plants, of which 9,000 are registered with local authorities. Mander et al. (2006) calculated the average purchase price of the most common medicinal plants to be 7.5 ETB per kg and the total mass of medicinal plants consumed to be 56,410 tonnes in 2005, of which 87% originated in the wild. The same study estimated the value of medicinal plants to be 2.66 billion ETB.

Another group of forest-based enterprises in Ethiopia are cooperatives established to manage forests through PFM. These cooperatives are involved in forest product trade mainly of non-timber and a few of them with timber/wood from natural forests (e.g. in Adaba-Dodolla) and plantation forests (e.g. Mojo and Chilimo). There are hundreds of such cooperatives, including Village Saving and Lending Associations (VSLA) and business groups established under PFM to generate income from forest-based products. A large group of communities are organized into cooperatives to produce wild coffee, honey, incense, essential oils. Some are also engaged in eco-tourism.

SMFEs have great potential to reduce poverty in Ethiopia, but in their present unregulated state they also represent a threat to the country's declining forest resources (Abebe et al., 2009). The challenges facing small and micro forest based enterprises include limited investment, access to credit, training opportunities, business management and knowledge of the natural resource base. SMFEs have limited capacity and are unable to add significant value to the natural resources they use. They are not organized into associations that could tap into the more lucrative national and international markets. These are currently dominated by large enterprises. They require formalization, institutionalization (e.g. association formation), human capacity development, and modernization through support (e.g. financial and technical) for use of appropriate technology. This should increase their output quantity and quality, and support value chain development. Linking some of these with market and upstream value chain actors through the development of forest product clusters can significantly enhance their economic contribution.

4.7 Public private partnerships

A partnership between the government and private sector companies, called public-private sector partnerships (PPP) is one approach to improving forest management in Ethiopia by soliciting greater funds from the involvement of the private sector. In fact, PPP is a new and emerging form of forest industrialization in Ethiopia, an example is a recent partnership between Amhara Forest Enterprise and a Chinese private investor. There are also several discussions currently on-going between OFWE and foreign as well as national private investors for a similar arrangement. The definition of the private sector in the context of Ethiopia's forestry sector is being defined through ongoing Public-Private Dialogue (PPD) that has been initiated through the International Finance Corporation (IFC) in collaboration with Ethiopia's Chamber of Commerce.



Globally PPP is a widespread form of sustainable and responsible forest management and utilization. It is seen as a way to increase investment in forest development and forest industrialization. Further, such partnerships can make forestry relevant for rural development through effects such as generating employment, creating value from forests that otherwise remain commercially unused and transferring technology and knowhow. The partnerships allow the public and private sector to work together to address the interest of the private sector, while also safeguarding the long-term interests of the public and environmental and social sustainability. The partnerships allow quick access to productive public lands, improve poorly managed public forest stands, pool manpower and financial resources to run a viable forestry business including profitable forest resource base development.

Therefore it is essential for Ethiopia to forge existing global experiences of forest based PPP, both at the resource development level and for forest industrialization to speed-up its forest sector development. To improve and transform Ethiopia's forest sector it requires huge investment and PPP is one viable option to explore and promote. Legislative support for PPP should be put in place and it should be promoted to attract domestic and foreign private sector involvement in the forest sector in the form of PPP.

4.8 Barriers to improving forest productivity and value chains

A number of factors are hampering the public and private investment required to improve the sector productivity. One challenge is identifying land that is suitable for commercial forestry and that has been designated by regional states. Other major constraints observed include low technical quality and availability of skilled labor in the forest sector in the country, poor coordination between sectors to support investment, very weak or inadequate law enforcement making investment risky, and weak business association and lack of organization of producers as well. In the following, key barriers identified are detailed.

Intersectoral coordination

Forest production, processing, investment land management, licensing, import and export related issues as well as environmental and social safeguards all fall under the mandate of different government institutions at federal and regional levels, including MEFCC, Ministry of Industry, Investment Authority, Agricultural Land Management Agency, etc. Close relationships have to be established with a large number of institutions to succeed with any investment. Therefore, strong cross-sectoral coordination is required to enhance efficient support services to the private sector.



Suitable land for commercial forestry

Access to suitable land with the ability to achieve economy of scale is a barrier for the private sector to engage in commercial plantation development. However, suitable land has not yet been identified in the same way as it was for large-scale agricultural investments. Sub-Article 2(d) of Article 52 of the Constitution entrusted the power to administer land and natural re-sources to the regional states in accordance with laws enacted by the federal government. This implies that regional states have the huge responsibility to identify and designate land suitable for commercial development. Clear guidelines on how to identify and designate suitable land with better access to existing and forthcoming infrastructure should be developed by ME FCC in consultation with relevant stakeholders.

Access to long-term financing

Given the long gestation period of forest crops, access to long-term financing is crucial for investment in forest production and associated value chains. Existing financing institutions, both government and private, focus mainly on short maturing loans. State-owned banks give priority to the manufacturing sector based on the priorities set by the government. In a situa-tion where different projects are competing for limited financial resources, forestry projects, particularly these in the area of plantation development, get less priority.

Currently, the government of Ethiopia provides different incentive packages to attract investments. As far as incentives are concerned, forestry projects are second only to investment projects in the area of industrial zone development in terms of benefit packages. However, no project registered so far aims to invest in the area of commercial plantation development using these tax incentives. In the absence of access to long-term financing to build the infrastructure and start the business, tax incentives alone cannot motivate private investors.

Research and development

Forest sector development is not benefiting from research due to poor research extension linkage. Modern laboratory equipment is essential for state-of-the-art research such as cloning, genetic characterization or wood research, but laboratory facilities are often out of date or not working properly. The research system also suffers from the lack of skilled personnel in some disciplines such as wood technology, forest genetics, and laboratory technicians to operate modern and high tech equipment.

There is little information available about the history of the plantation stands, growth rate, provenances, silvicultural treatment schedules, etc. Due to frequent institutional restructuring, there has been limited continuity in building up complete forest information systems such as those required for forest management planning. Based on the lessons learnt from past failures, there is a need to guide future plantation developments by introducing state of the art technologies to speed up the process of plantation development and supply the raw materials required for wood-based industries.



Technical support to smallholder farmers in woodlot management

Relevant government sectors have played an important role in supplying planting materials to smallholder farmers. However, little technical support was provided with regard to how to manage the woodlots, particularly for farmers growing exotic species. Moreover, marketing and value chain support is missing to link farmers to the existing limited wood-based industries in an organized manner to reduce the production costs of supplying raw materials. Consequently, existing industries are running short of raw materials while there is an abundance of trees in the landscape grown by smallholder farmers.

4.9 Opportunities to increase forest productivity and value chains

Considering the Ethiopian context of economic and demographic growth, urbanization, and both private and public consumption expenditure, the demand for forest products and other forest derived ecosystem services will increase substantially in Ethiopia over the decades to come (FSR 2015). Ethiopia currently spends an estimated annual total of USD 183 million on wood product imports. Shifting this expenditure on imports to investment in sustainable domestic forestry production could contribute significantly to the country's priority development objectives such as green growth, industrialization, and job creation in rural areas.

There is an urgent need to establish the commercial forest plantations required to deliver the high quality forestry products demanded by the growing middle class and booming construction sector. Investing in forest resources should be the immediate priority, but this requires strong public commitment to reduce the risks associated with forest investments, which provide returns only in the long term. The commitment is there — two key government development policies that prioritize forest sector development are the CRGE strategy and GTP II. These two policies complement each other on the issue of forest sector development and their alignment shows the strong commitment of the government to the sector. Further, upgrading the former Environmental Protection Authority to the MEFCCC in 2013 is another indicator of the GoE's commitment to the sector.

Ethiopia has a conducive and biologically productive climate and soil resources, which can make forest based investment rewarding. Rapid road and railway development increasingly provides the infrastructure network required to reduce cost of production and transport. Strong forest sector support from development partners may alleviate the Government's financial constraints in order to create a strong incentive mechanism for private sector involvement at all levels of the forest product value chain, including resource base development either on their own or in partnership with public enterprises and community. These all create a unique opportunity for the development of the sector through public and private expenditures.



5 Forest Environmental Functions

The CRGE strategy demonstrates the commitment of Ethiopia to bypass the conventional approach to economic development and create a green economy where economic development goals are met in a sustainable way. The strategy identifies the following four pillars of development in the green economic action plan:

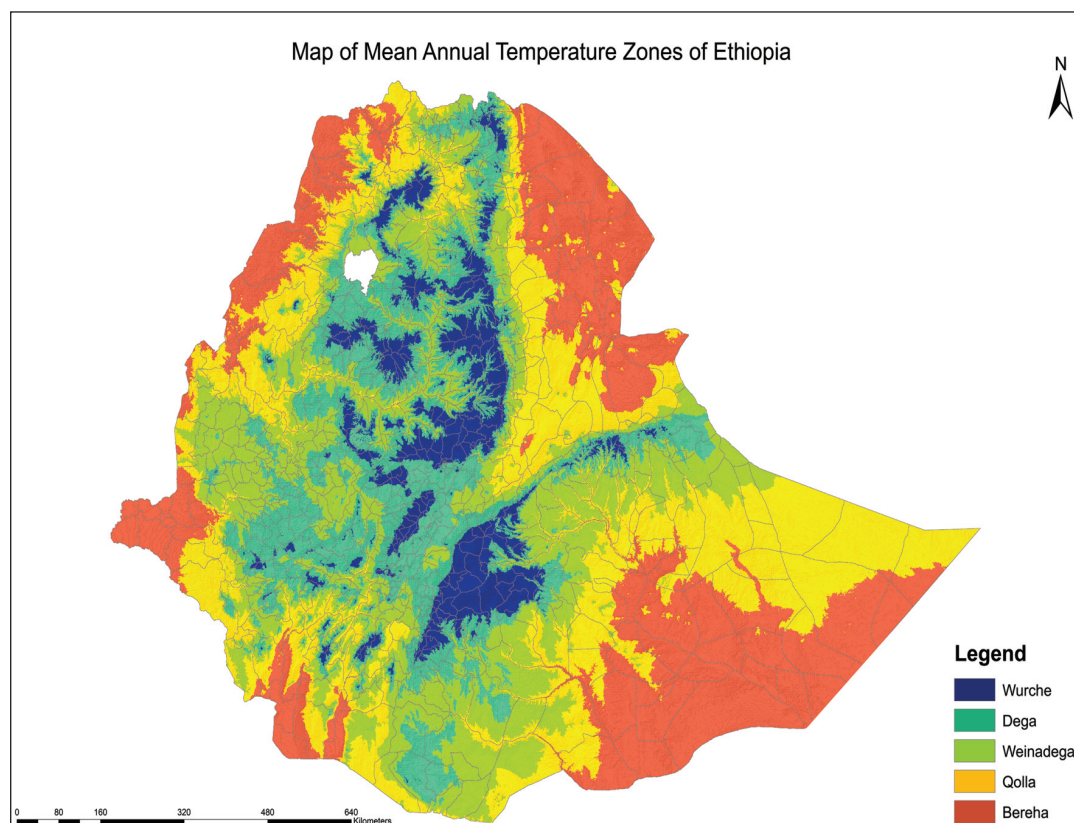
1. Improve crop and livestock production practices for higher food security and farmer income while reducing emissions;
2. Protect and re-establish forests for their economic and ecosystem services, including as carbon stocks;
3. Expand electricity generation from renewable sources of energy for domestic and regional markets; and
4. Leapfrog to modern and energy-efficient technologies in transport, industrial sectors, and buildings.

5.1 Climate and climate change in Ethiopia

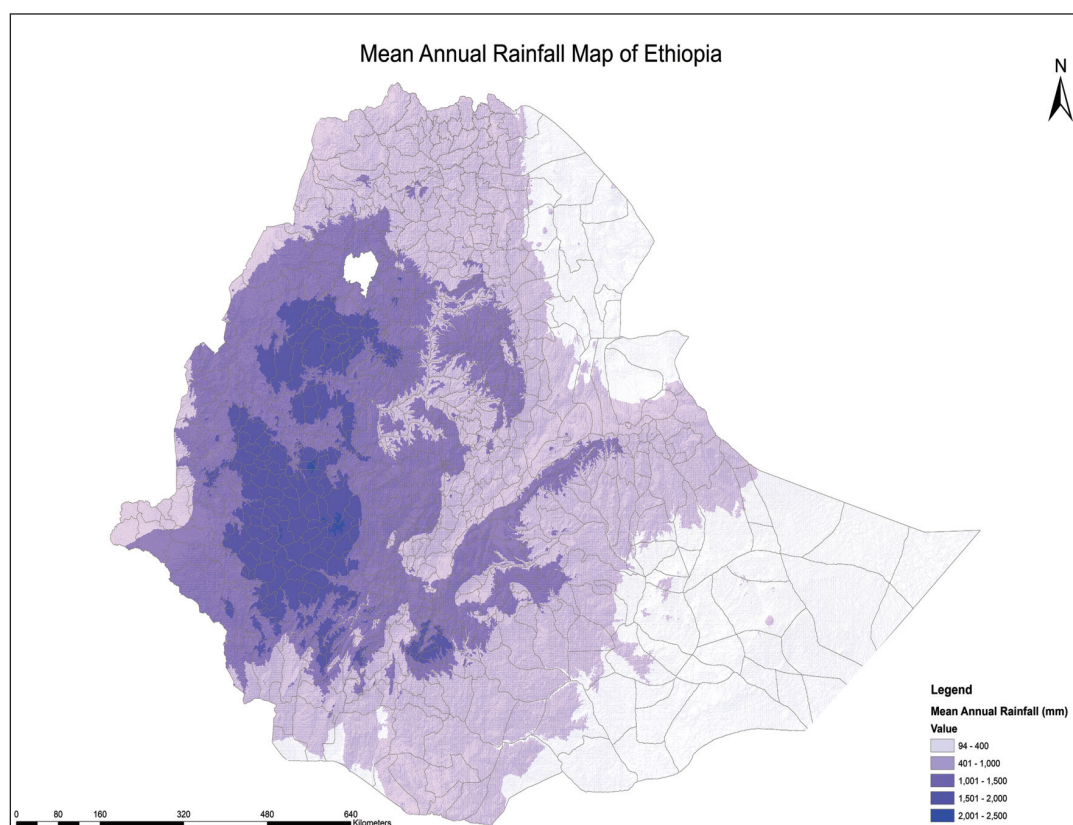
Ethiopia's CRGE strategy is supported by two strategy documents: the Climate-Resilience Strategy for agriculture and forestry presented here, as well as Ethiopia's Program of Adaptation to Climate Change (EPACC). The Climate-Resilience Strategy focuses on agriculture and forestry sectors due to their importance to national income (43% GDP) and livelihoods (the sectors employ 80% of Ethiopian people). This strategy will act as a starting point for subsequent resilience building across the remaining sectors of the economy (GOE 2015).

Climatic conditions vary widely across Ethiopia, influenced strongly by altitude. Temperature, depicted as agroecological zones (Figure 15) and rainfall (Figure 16) are the key variables influencing land cover including forest vegetation and land use potential.

Figure 15: Mean Annual Temperature



Source: <http://www.wri.org/applications/maps/forestatlas/eth/>

Figure 16: Mean Annual Rainfall

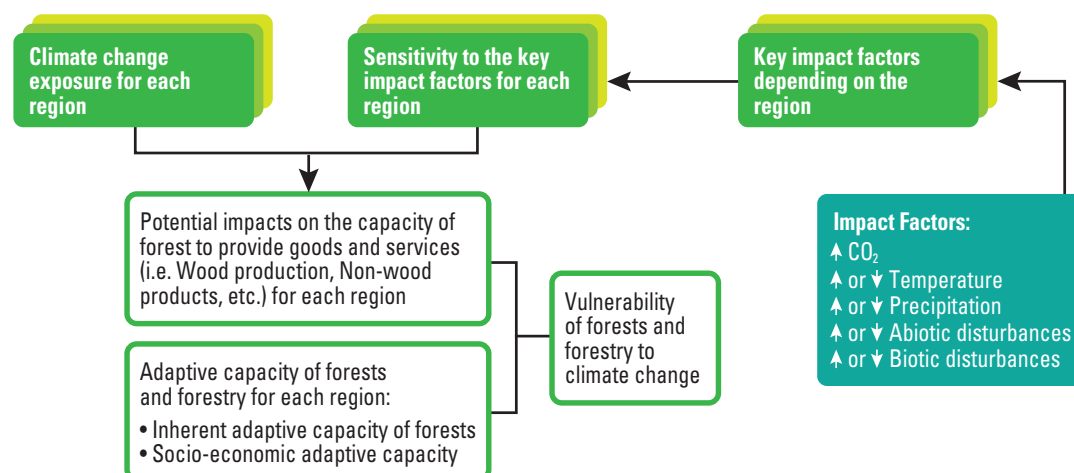
Source: <http://www.wri.org/applications/maps/forestatlas/eth/>

5.1.1 Climate vulnerability and adaptation

Forest sector vulnerability to climate change

Vulnerability to climate change depends on the ability of both natural ecosystems and society to cope with the impacts (Schröter et al. 2005). Lindner et al. (2010) provide a conceptual framework for analyzing vulnerability (see Figure 17), which we have adapted for this study.

Predicting the impact of trends into the future is hard to quantify, due to a lack of reliable models, but even the changes that have occurred to date are cause for concern. This section looks first at the likely impacts of climate change for natural ecosystems, and then on the ability of Ethiopian society to respond to the impacts. In the context of Ethiopia, ongoing programs such as the Productive Safety Net Program (PSNP) aim at enabling the rural poor facing chronic food insecurity to resist shocks, create assets and become food self-sufficient.

Figure 17: Scheme of the approach followed to assess climate change impacts and vulnerability

Source: Lindner et al (2010)

Reviewing the climate change impacts, adaptive capacity, and vulnerability of European forest ecosystems, Lindner et al. (2010) observe that forests will have to adapt not only to changes in mean climate variables but also to increased variability with greater risk of extreme weather events, such as prolonged drought, storms and floods. While models are not yet sufficiently developed to predict the future climatic trends in Ethiopia, increases in climate variability are likely outcomes of climate change. Anecdotal evidence suggests this variability is already being witnessed.

Forests are particularly sensitive to climate change, because the long lifespan of trees does not allow for rapid adaptation to environmental changes. Associated with climate change, there are several factors affecting forest ecosystems, which can act independently or in combination.

Knowledge about potential climate change impacts in different forest ecosystems in Ethiopia, and current understanding of regional differences in vulnerability is limited (Deressa 2006 and World Bank 2010). Nonetheless, there is a general consensus that the frequency and severity of the impacts from the range of factors affecting forest ecosystem health, functioning, and the delivery of ecosystems services is likely to further increase as a result of climate change (Table 13). The inherent adaptive capacity of Ethiopia's tree species and forest ecosystems to these factors is also poorly understood. However, the negative impacts of climate change are very likely to outweigh positive trends – especially in the drier parts of Ethiopia. These different impact factors will affect Ethiopian forests. However, the severity of impacts on forest goods and services will depend on the regional context and the specific changes in climate.

**Table 13: Factors affecting forest ecosystems that can be influenced by climate change**

Factor	Consequence of change in factor
Temperature	A long-term trend towards warmer temperatures has been recorded in Ethiopia. In a tropical climate, the increase in growing season and photosynthesis rates may be negligible. Effects of increases in temperature will differ with location, because bio-climatic zones in Ethiopia differ in their limitations for forest production. An increase in temperature alone may be beneficial for forest growth in cooler, high altitude sites, but interaction with other climate or site-related factors could alter the response. However, in other regions of the country — where water availability restricts productivity — detrimental effects of increasing temperature are probable, especially if precipitation does not increase, or there are shifts between seasons, exacerbating seasonal water stress.
Increasing atmospheric CO₂ content	Generally, higher atmospheric CO ₂ content will increase forest growth and wood production, <i>photosynthesis rates</i> , but vary with plant nitrogen status and species.
Changes in precipitation	Rainfall changes that cause extreme events such as extended droughts will have more drastic consequences on tree growth and survival than gradual changes in average climate conditions. Water limitation is expected to increase from the south-western moist areas to the eastern and northern drier areas. In combination with increases in temperature, this could lead to more droughts, especially in the northern and eastern regions. In these areas heat is often a stress factor.
Abiotic disturbances	The main abiotic disturbances are fire, wind, flooding and drought, all of which may be affected by climate change:
• Fire	Fire is a regular annual phenomenon during the dry season (January-March) in Ethiopia, but affects mainly the western part of the country. To the east, where open vegetation dominates, there is insufficient fuel to sustain a wildfire.
• Changes in wind-storm	Storms can cause wide-scale damage in natural and plantation forests, resulting in reduced yields of recoverable timber, increased costs of unscheduled cuttings, problems in forestry planning, and considerable carbon releases (Lindroth et al. 2009). Increased frequency and intensity of storms can have strong implications for forest ecosystems, causing greater damage to forests, and less time to recover between events.
• Flooding	Changes in both climate and watershed management can change the frequency and extent of flooding. Flooding events are expected to occur more frequently with consequences for the dynamics of riparian tree species and flood-prone areas.
• Drought	Addressed under precipitation, above.
Biotic disturbances	The main impact of climate change on biotic disturbances is the result of frequency and consequences of pest and disease outbreaks.
• Pests and diseases	Population dynamics and occurrence of exothermic organisms, such as insect herbivores, and the pathogenicity of fungal diseases will be strongly influenced by altered environmental conditions. Climate change will alter the frequency of pest outbreaks. However, the consequences for certain species will differ with geographic regions and the extent of climatic change.
Other changes in the chemical atmospheric environment	Ground-level concentrations of ozone may increase drought stress in trees (McLaughlin et al., 2007). Atmospheric nitrogen deposition is a major factor influencing forest growth and other ecosystem characteristics in temperate and boreal forests, (Magnani et al., 2007; Kahle et al., 2008) and probably also influence tropical forest growth. Both ozone and nitrogen deposition affect tree physiology, carbon allocation and plant interactions, resulting in complex interactions with other climatic impact factors such as drought (e.g. Matyssek et al., 2006).

Source: Adapted from Lindner et al (2010).



Probable impacts of climate change on forests

Impacts of climate change resulting from the range of factors can be multiple. Some are direct, and some indirect.

Direct:

- **Increased risk of fire:** Drier conditions will increase the risk of fire, making forest fires both more frequent and more intense, resulting in degradation. Once degraded, with dying or dead trees with a high fuel load, the forests become more prone to fire, thus creating a negative feedback loop.
- **Shift in distribution and extent of natural habitats and biodiversity:** Climate change affects the stability and productivity of forests and woodland dynamics in Ethiopia (Dale et al. 2001). Areas in which prevailing climatic conditions were previously suitable to support one or another type of forest ecosystem may be rendered less suitable by changes in average climatic conditions and extreme events resulting in increased forest susceptibility to fires, pests, and diseases. A changing climate is likely to have a negative impact on biodiversity, as species and ecosystems may be unable to adapt to the changes. Climate change, interacting with human drivers such as deforestation and forest fires, are a threat to Africa's forest ecosystems. Boko et al. (2006) report that it is estimated that, by the 2080s, the proportion of arid and semi-arid lands in Africa is likely to increase by 5-8%.
- **Land use change:** One of the major predicted impacts of climate change is on patterns of land use. However, historical estimates of the rate of land cover change at the continental level found it difficult to analyze trends (see e.g. Lambin and Ehrlich, 1997). A study of forest gain and loss (MEFCC, 2016) provided an estimate of forest change by biome. The ongoing National Forest Inventory (Ministry of Environment, Forestry and Climate Change with FAO) and analysis of LandSat imagery from the 1990s to present are expected to provide land cover or land cover change data for the period from 2000 to the present, which should reveal trends.
- **Invasive Species:** Climate change may create conditions that are more favorable for invasive species (McNeely 2004). There are certain woodland areas in Eastern Ethiopia (Afar and Somali Regions) where *Prosopis juliflora* is causing considerable socio-cultural damage (FAO, 2015). But the exact extent of the area affected by this invasive woody species and the magnitude of damage is not known. *Prosopis*, being an aggressive, very deep-rooted species is able to draw water from deeper sources than some indigenous species, and thus depriving them of water, resulting in increased mortality, and shifts in species composition in affected areas. The invasion of foreign species has resulted in the decline of agricultural and livestock productivity, increasing incidence of health problems for both livestock and humans (Zeraye 2008 and 2015) and exacerbated biodiversity loss (Berhanu and Tesfaye 2006, Kebede 2009).

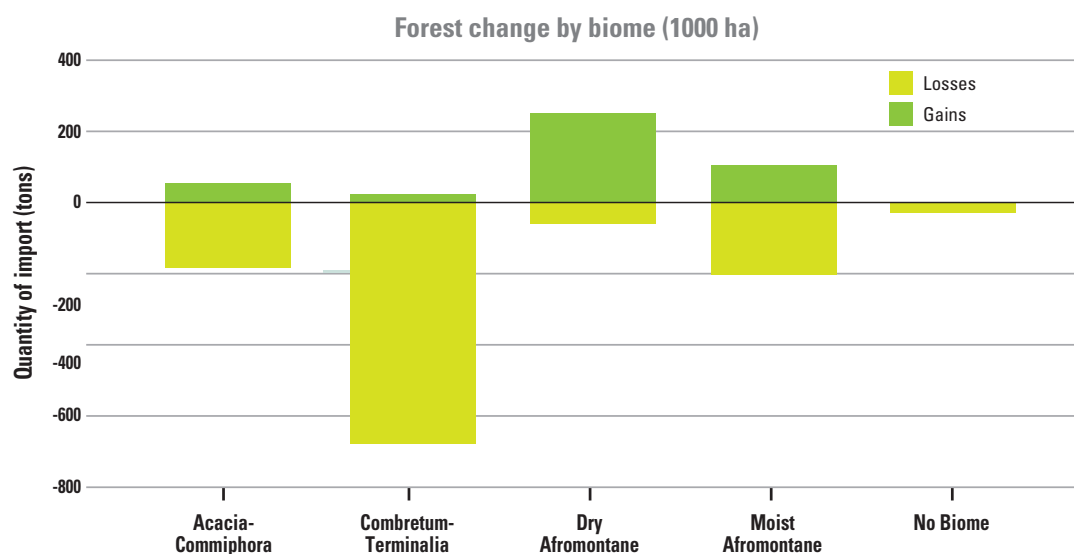


- **Forest-dependent livelihoods:** Changes in forest/woodland ecosystems extent, quality and species composition is likely to have an impact on the livelihoods of forest-dependent communities. As a consequence of deforestation, there is an acute shortage of fuelwood, construction timber, and non-timber forest products (NTFPs) in addition to disrupted ecosystem functions (soil erosion, hydrological imbalance, loss of biodiversity, etc.).
- **Forest industry:** Deforestation coupled with poor forest-sector development has resulted in severe industrial wood shortages, causing the country to rely mostly on imported wood and wood products.

Indirect:

- **Changing climatic conditions:** Making agriculture more precarious in current agricultural production areas, drives farmers to move into higher rainfall areas – which are woodland and forest areas.
- **Increasing demand on forests to diversify source of livelihoods** as agricultural systems become more precarious as a result of climate change this may increase pressure on forests.
- **Perverse incentives:** Government programs intending to promote agricultural production to achieve food security or climate resilience are being promoted in forested or wooded landscapes which may unintentionally drive deforestation.

Figure 18: Results of the national forest area change detection 2000-2013, at the national scale and by biome



Source: Ministry of Environment, Forestry and Climate Change, Government of the Federal Democratic Republic of Ethiopia (2016).

Adaptation of forest management practices to climate change

In the context of climate change, there is a need to consider the vulnerability of the forest sector in the face of climate change. It is important to consider how forest ecosystems may adapt to climate change, and second how forests might be used to assist Ethiopia and its communities to adapt to climate change. This section addresses these two aspects separately, but recognizes that they are closely related.

“Adaptive capacity” consists of the inherent adaptive capacity of trees and forest ecosystems and of socio-economic factors determining the capability to implement planned adaptation (Lindner 2010). Adaptive capacity is therefore influenced by the level of management in any particular forest or forested area.



One of the major challenges for forest owners and stakeholders is managing the uncertainty caused by climate change. Forest management strategies and practices are likely to adapt to changes in growth rates, shifting species and provenance suitability, and increasing risks of disturbance, in particular drought, fire and wind. Since these changes will probably occur at a faster rate than the rate at which ecosystems are able to adapt autonomously (UNECE and FAO 2011), forest management needs to support adaptation with targeted and planned measures. Research in Europe has identified many adaptive management measures for plantation forestry, including modifications in the choice of species, rotations, thinning schedules, harvesting operations, drainage and other activities that can support responses to the changing climate (Kolström et al. 2011). However, similar studies have not yet been conducted in the specific context of Ethiopia. As precise forecasts of future climate conditions are not expected, it is crucial to incorporate better uncertainty and risk factors into adaptive forest management.

Adaptation of agricultural practices to climate change

In Ethiopia, the major economic impacts of climate change are likely to be felt in the agricultural sector. The costs of climate change on agriculture have been estimated by Deressa (2006) and World Bank (2010).

From a survey conducted during the study, the World Bank (2010) identified the most common forms of adaptation practices currently used by households. These include (a) crop selection of drought-tolerant crops; (b) terrace rehabilitation; (c) soil erosion prevention programs; and (d) homestead or forest restoration and change of planting dates. Income diversification strategies (including migration, non-timber forest product sales, handicrafts, and timber sales) were not common. The households in these areas (drought-prone highland, midland, and low-land areas) already face significant deprivation, with the majority of surveyed households re-reporting food shortages during part of the year.

Deressa et al. (2009) indicate that the level of education, gender, age, and wealth of the head of household; access to extension and credit; information on climate, social capital, agro-ecological settings, and temperature all influence farmers' choices. The main barriers include lack of information on adaptation methods and financial constraints.

Consequently, policies aiming at promoting adaptation to climate change need to emphasize the crucial role of providing information on better production techniques and on climate change (through extension) and creating the financial means through affordable credit schemes to enable farmers to adapt to climate change.



Social capital, which was represented by farmer-to-farmer extension and the number of relatives in local area, also affect adaptation to climate change positively. Policy interventions which encourage informal social networks (financially or materially) can promote group discussions and better information flows and enhanced adaptation to climate change. Moreover, farmers living in different agro-ecological settings used different adaptation methods. Thus, future policy must provide adaptation technologies through targeted research in each agro-ecological area.

How forests can support communities to adapt to climate change

Ethiopia's Climate Resilience Strategy Agriculture and Forestry identified 41 key options to address the negative impact of weather variability and future responses to agriculture and forestry to climate change. These include cross-cutting options such as information sharing and institutional strengthening, as well as sector-specific interventions, such as irrigation and for crops and improved breeding programs for livestock.

The adaptive capacity in the forest sector must be fully utilized by protecting existing forest resources and re-establishing climate-resilient forests. Few studies have assessed vulnerability of forestry per se (as a sector consisting of national and local institutions and businesses). The regional context is important, as impacts can be both positive and negative and ability and strategies to cope with climate change impacts will differ.

Socio-economic factors that determine adaptive capacity to climate change include economic development, technology and infrastructure, information, knowledge and skills, institutions, equity and social capital (McCarthy et al. 2001). These can be increased through investment.

The strengthening of community and/or individual tenure over forest land and resources, the creation of forest co-operatives to invest in adaptive measures and reduce the impacts of climate change (for example through collective forest restoration, and protection against threats such as fire) and active support from public forestry administration are possible measures to alleviate adverse impacts of climate change.

It is important for policy-makers to recognize that forests can provide a safety net to communities when conventional sources of livelihood fail – as a source of additional food, fodder and fuel. However, such emergency measures will itself put additional pressure on the forest – potentially further degrading the forest ecosystem that is already under stress from climate change.

5.1.2 Climate mitigation

The role of forests to achieve carbon neutral development

The potential for forests to mitigate climate change has been widely studied, because it could provide a means to circumvent the issue of reducing the use of fossil fuels (Dixon et al., 1994; Niles et al., 2002; Canadell and Raupach, 2008; Canadell and Schulze, 2014; Lundmark et al., 2014).

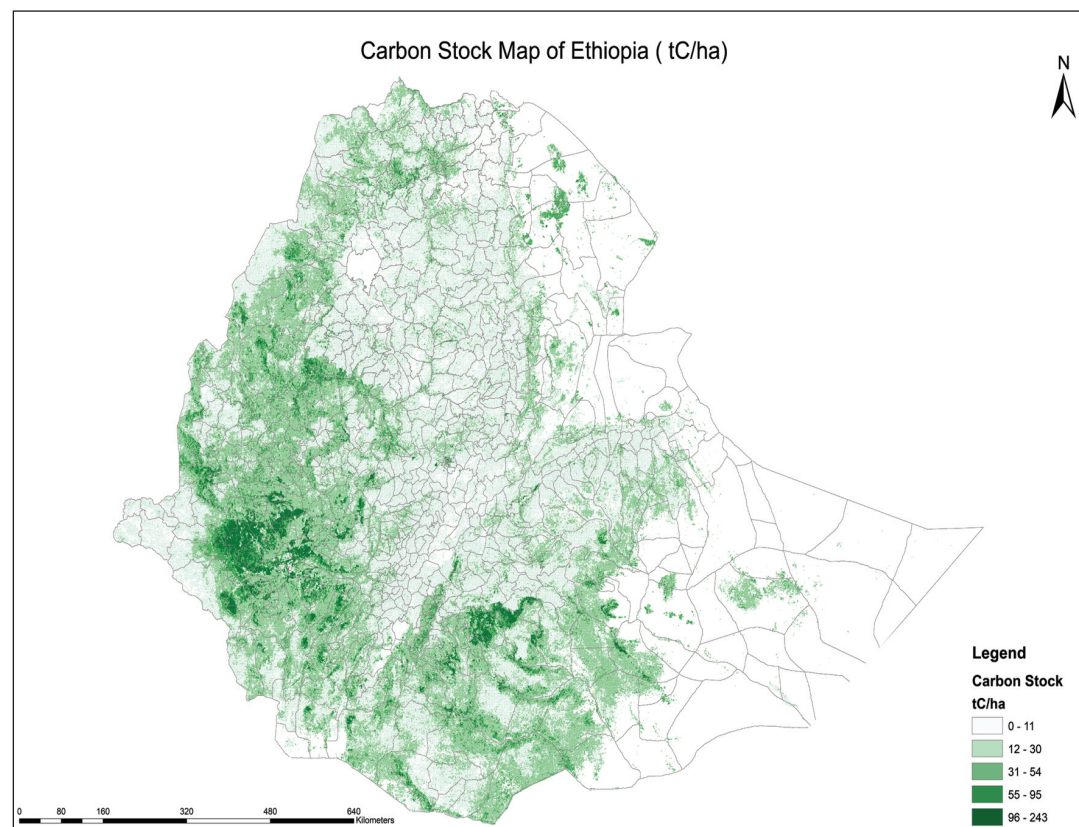


The proposed NFSDP could play a central role in Ethiopia's CRGE strategy by reducing emissions from forestry and other land uses while increasing the resilience of ecosystems and generating multiple ecosystem services. Deforestation and forest degradation accounted for 37% (55 Mt CO₂e) of the nation's greenhouse gas emissions in 2010 (FDRE 2011). Therefore, the forestry sector plays a key role in achieving Ethiopia's commitment to limit future total emissions in 2030 to 145 Mt CO₂e. Approximately half (130 Mt CO₂e) of the total CRGE intended reduction of 255 Mt CO₂e are expected to result from forestry sector interventions.

Carbon stocks in Ethiopian forests

Carbon stocks are closely correlated to tree cover density with the highest carbon stocks in the high forest area. The Carbon Density map shows that there are relatively few regions with high carbon densities, about one third of the country (the driest areas) have very low carbon stocks of between 10-34 t C/ha and about one third has between 35 and 55 t C/ha (Figure 19). The high carbon stocks are concentrated in the Regional States of Benshangul-Gomaz, Oromia and Gambella, and the Southern Nations, Nationalities and Peoples' Region.

Figure 19: Carbon Density



Source: <http://www.wri.org/applications/maps/forestatlas/eth/>



REDD+- Reducing Emissions from Deforestation, forest Degradation, conservation, SFM and forest carbon stock enhancement

Ethiopia has been actively engaged in the REDD+ process, both at the national and regional level. As explained above, due to the importance of forests in climate mitigation, REDD+ is embedded in Ethiopia's CRGE Strategy, which envisions bringing the country to middle-income status by 2025 while maintaining zero net greenhouse gas emissions. Ethiopia is receiving international support to achieve REDD+ readiness and prepare the country for receiving results-based payments for emission reductions in the forestry sector. The national REDD+ Readiness program – primarily coordinated under the REDD+ secretariat at MEFC – intends to serve as a vehicle through which the CRGE objectives on land use and forestry sector are achieved.

Ethiopia is a participant country of the Forest Carbon Partnership Facility (FCPF) REDD+ Readiness Program – funded jointly by FCPF and the Governments of Norway and the UK. As part of achieving REDD+ readiness, Ethiopia is currently preparing its national REDD+ strategy. This strategy aims to reduce emissions from deforestation and forest degradation by employing a landscape level approach whereby multiple benefits will be generated, i.e. not only climate mitigation but livelihood benefits as well. The main challenge is that deforestation in Ethiopia stems mainly from sectors outside the forest sector. Therefore, in order for REDD+ to be successful, increased coordination between sectors with links to deforestation and forest degradation will be required. Also, the GoE is promoting Participatory Forest Management (PFM) as a key REDD+ strategy option, which is as relevant as a FLR option (MoANR SLM 2015; Mekonen et al. 2015) (see Chapter 7 for more information on PFM).

Deforestation estimates and causes of deforestation and degradation

Deforestation and land degradation is widespread in Ethiopia due to the high levels of human pressure and unsustainable land use. Noting Ethiopia's largely rugged topography, it has been estimated that 27 million ha of land in the highlands are degraded, of which 14 million ha are severely eroded (Lemenih & Kassa 2014, Berry 2003).

Deforestation has greatly contributed to land degradation in Ethiopia. By the end of the 18th century, forests in Ethiopia covered more than 45 million ha, or around 40% of Ethiopia's surface area (Tesfaye et al. 2014). In 2010, only 12.3 million ha of forested land remained, covering approximately 11% of the total surface area. At the national level, the rate of deforestation and forest degradation in Ethiopia ranges from 140,000 to 200,000 ha/year and has resulted in severe land degradation and loss of biodiversity (FAO 2010) (Table 14). There has been a continued loss of forest between 2000 and 2010. Figure 20 shows that although there are regional differences, tree cover loss has generally been increasing in the recent past.

**Table 14: Tree cover loss and gain**

Regional State	Forest Loss (Ha) (>10% Canopy Cover)	Forest Gain (Ha) (>50% Canopy Cover)
Period	2001-2014	2001-2012
Addis Ababa	335	579
Afar	72	12
Amhara	7,385	4,264
Benshangul-Gumaz	58,755	922
Dire Dawa	3	0
Gambella Peoples	15,914	1,161
Harari People	16	0
Oromia	188,960	42,351
Somali	869	251
Southern Nations, Nationalities and Peoples' Region	107,406	12,609
Tigray	1,569	389
Total	381,285	62,538

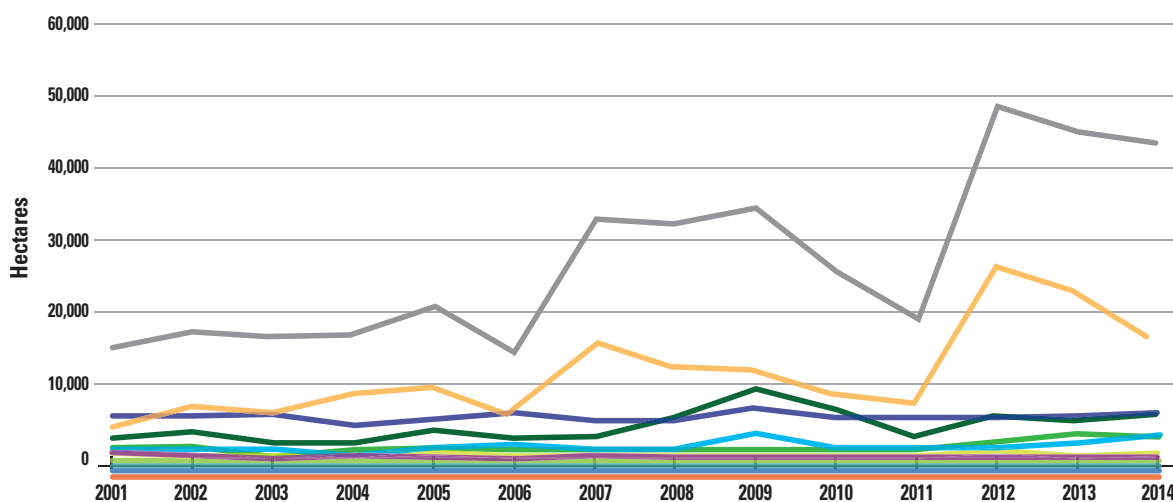
Source: <http://www.globalforestwatch.org/country/ETH/6>

NOTE: Due to variation in research methodology and/or date of content, tree cover and tree cover loss and gain statistics cannot be compared against each other. Accordingly, "net" loss cannot be calculated by subtracting tree cover gain from tree cover loss, and current (or post-2000) tree cover cannot be determined by subtracting annual tree cover loss from tree cover in 2000.

Further, "tree cover" does not equate to "forest cover." "Tree cover" refers to the biophysical presence of trees, which may be a part of natural forests or tree plantations. Thus, loss of tree cover may occur for many reasons, including deforestation, fire, and logging within the course of sustainable forestry operations. Similarly, tree cover gain may indicate the growth of tree canopy within natural or managed forests.

The drivers of deforestation and forest and land degradation vary greatly at the regional and local levels. The main direct drivers of deforestation are small-scale agricultural expansion and fuelwood consumption, and to a lesser extent, illegal logging and forest fires (FDRE 2011). Another important driver has been identified as large-scale agricultural investments, which until recently were promoted by the government as a vehicle for rural development and economic growth. Overgrazing, settlement, and uncontrolled tree harvesting and utilization also contribute.

Further problems include soil characteristics (such as its inherent erodibility and fertility), intense and erosive rainfall periods, the steep and dissected terrain in the highlands, deforestation, overgrazing, cultivation on steep slopes, frequent plowing, limited adoption of soil and water conservation measures, declining use of fallow, burning of dung and crop residues, feeding of crop residues, soil burning, and limited application of organic or inorganic fertilizers (Pender and Ehui 2000).

Figure 20: Tree Cover Loss 2001-2014 (>10% Canopy Cover)

Regional State	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Addis Ababa	32	3	3	3	61	8	13	8	9	16	18	75	29	58
Afar	3	3	1	4	2	3	2	3	1	1	3	8	19	18
Amhara	136	483	50	296	356	209	290	294	332	334	316	622	1,913	1,754
Benshangul-Gumaz	1,893	2,521	1,205	1,271	3,921	2,164	2,636	6,547	9,458	7,487	2,248	6,006	5,266	6,130
Dire Dawa	-	-	1	-	-	-	0	0	-	0	0	0	-	-
Gambela Peoples	503	548	853	191	737	1,433	833	889	2,619	1,052	1,145	1,098	1,458	2,554
Harari People	1	1	0	2	1	1	2	1	0	1	1	6	1	-
Oromia	6,763	9,335	8,203	10,438	11,225	7,957	17,728	14,323	13,509	10,093	9,806	27,295	24,115	18,169
Somali	354	65	6	81	24	41	30	140	45	29	18	34	2	1
Southern Nations, Nationalities and Peoples	4,719	4,261	6,566	5,007	4,477	3,032	10,140	8,994	8,536	6,505	5,396	13,830	12,110	13,831
Tigray	26	49	9	23	22	28	73	24	56	38	68	87	534	532
Total	14,430	17,272	16,897	17,316	20,825	14,875	31,746	31,225	34,566	25,557	19,020	49,061	45,448	43,046

Source: <http://www.globalforestwatch.org/country/ETH/6>



Many factors are hypothesized as underlying causes of these problems, including population pressure, poverty, limited market development, limited market access, land tenure insecurity and land fragmentation, lack of access to credit, short-term perspective of farmers, unavailability of appropriate and profitable technologies or inputs, farmers' lack of awareness of such technologies, farmers' attitudes, high costs of inputs, external costs or benefits of land management that individual farmers fail to take into account, and difficulties in achieving effective collective action to manage resources, among others. The limited policy focus given to agriculture is also reported as an underlying cause by Fitsum Hagos et al. (1999) and Lakew Desta et al. (2000). However, Ethiopia has been making important strides in improving agricultural productivity, as witnessed by the country's performance in CAADP.

Climate change is likely to exacerbate processes of soil degradation, through more frequent and intense rainfall and increased pressure on forests, farm and rangeland for production following climate shocks. Land degradation heightens vulnerability to climate change and reduces adaptive capacity at all levels through interlinked processes, such as sustained poverty, low growth, food insecurity and deforestation.

Inappropriate land management techniques differ for private and publically used lands. In privately used lands, farmers may be overexploiting local resources due to poverty and the need to ensure short-term food supply at limited levels of investment, or because they are unaware of the consequences of nutrients mining or mono-cropping on the productive capacity of their land for instance. On public land (which is typically where forests are found), there may be no sense of ownership of the resource leading to a tragedy of the commons problem where optimization of individual harvest levels leads to degradation of the common resource.

5.1.3 Environmental and social safeguards frameworks

The REDD+ Readiness process in Ethiopia has achieved a number of important milestones related to environmental and social safeguards. The NFSDP should build upon and learn from these existing achievements. The Oromia Forested Landscape Program (OFLP) has conducted a Strategic Environmental and Social Assessment (SESA), which is a comprehensive analysis of the risks and potential opportunities to maximize non-carbon benefits resulting from the REDD+ program. The result of the SESA is the development of an Environmental and Social Management Framework (ESMF), which is a risk mitigation tool that also helps to boost the sustainability of the REDD+ program. Further, the OFLP is in the process of developing a Benefit Sharing Mechanism which lays out how the program can equitably share the benefits resulting from the program with all relevant communities and land users. The experiences of this development can be useful for the NFSDP when designing community engagement strategies.



5.2 The role of forests in biodiversity conservation

5.2.1 Forest biodiversity hotspots

A biodiversity hotspot is a biogeographic region with significant levels of biodiversity that is under threat from humans. Ethiopia is one of the top 25 biodiversity-rich countries in the world (WCMC, 1994), and it has two of the world's 34 biodiversity hotspots — the Eastern Afromontane and the Horn of Africa hotspots. Ethiopian flora is estimated to contain between 6,500 and 7,000 species of higher plants of which about 12% are endemic (Tewolde Brehan Gebre Egziabher, 1991). Based on important Bird Areas of Ethiopia, about 91 biodiversity hotspots were recognized in the country (EWNHS, 2010). Some of these areas are National Forest Priority Areas. The most frequently cited number of national forest priority areas in Ethiopia is 58 as presented in Figure 21.

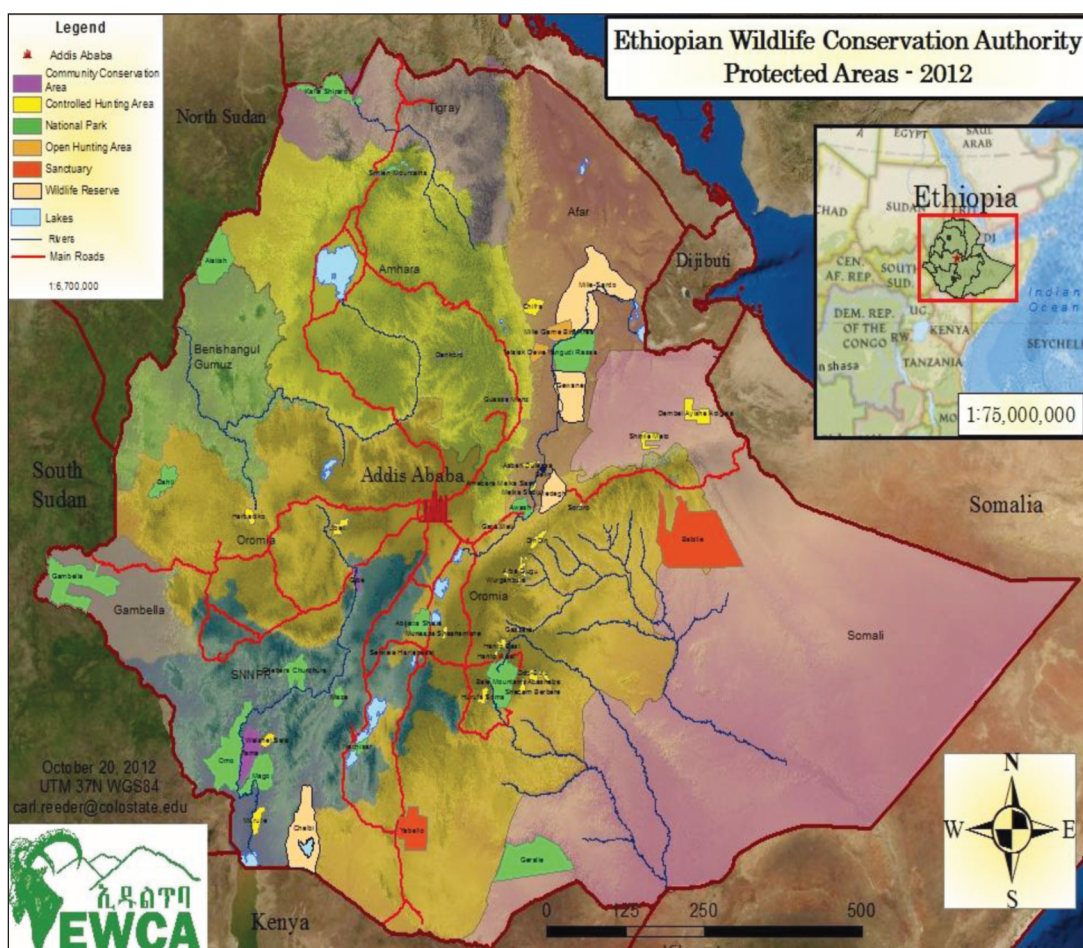
These NFPAs were proposed for protection in 1980 by the then Ministry of Agriculture for their production, protection and biological conservation services (EFAP, 1994). They were meant for sustainable management and they can best be used for *in-situ* conservation. Following the federal government system in Ethiopia, the responsibility for the legal establishment, administration and management of the NFPAs was transferred to the Regional Bureaus of Agriculture. Only some of them have been inventoried, demarcated and legally gazetted or proclaimed, with very few of them having management plans. Only those NFPAs whose gazettment has been pursued by the Regional Bureaus have legal status today. Currently, the majority of the proposed NFPAs are heavily deforested and fragmented as a result of forest clearance and land use conversion for smallholder agricultural expansion, promotion of large-scale commercial and state development investments in forest frontiers, illegal extraction and collection of forest products, government-led human settlement in forest areas, forest fires and increasing development of infrastructure and road networks in forest proximities (Bekele et al. 2015). However, there is no update of their status. There is an urgent need to review the situation and re-prioritize forest areas that should be legally protected, and to determine how best to work with Regional State Governments to pursue their protection and management.

Among the Horn of Africa countries, Ethiopia is also regarded as a major center of diversity and endemism for several plant species. This is due to the variation in climate, topography and soil in Ethiopia. Eight of Ethiopia's ten main ecosystems⁷ have different categories of forests (EBI, 2015). These diverse ecosystems lead to the presence of high levels of biodiversity, including some of the world's most valuable and rarest flora and fauna.

⁷ These are: Afroalpine and Sub-afroalpine Ecosystem, Grassland Ecosystem, Dry Evergreen Montane Forest and Scrub Ecosystem, Montane Moist Forest Ecosystem, *Acacia-Commiphora* Ecosystem, *Combretum-Terminalia* Ecosystem, Lowland Tropical Forest Ecosystem, Desert and Semi-Desert Scrub Ecosystem, Wetland Ecosystem and Aquatic Ecosystem.



Figure 21: Ethiopia Protected Areas



The Ethiopian Afromontane rainforests have been designated as part of the Eastern Afromontane Biodiversity Hotspot, which is a globally important site for biodiversity conservation (Mittermeier *et al.*, 2004). A segment of the Ethiopian Afromontane rainforests are also known as the center of origin and diversity of wild population of Arabica coffee (*Coffea arabica*), which grows as a forest understory shrub (Tadesse Woldemariam, 2003; Feyera Senbeta 2006; Kitesa Hundera et al., 2013).

The Afromontane rainforests are of high conservation importance (because of high genetic diversity of coffee gene pools and plant diversity) and are highly valued for their economic (as sources of spice, coffee, and honey) and ecological services like protection of several river basins.



These vegetation systems are being threatened by deforestation and forest degradation via various direct and indirect mechanisms. For example, during the past decades, large parts of the Ethiopian Afromontane rainforests with wild coffee have become increasingly disturbed and fragmented due to forest conversion to settlements and agricultural land, and forest modification by timber extraction and wild coffee management interventions (Reusing 2000; Feyera Senbeta & Denich, 2006; Schmitt et al., 2009). This has threatened wild coffee populations and endangered the exceptional floristic diversity of these forests. The other vegetation types are facing similar threats as a result of human pressure such as unsustainable resource use and deforestation for agriculture, settlement and establishment of plantations.

In order to address some of the challenges, Ethiopia has issued various biodiversity management policies and strategies and also ratified various international agreements meant to improve conservation and sustainable use of the country's biological resources. The regional states in Ethiopia have also developed policies or legislation for effective biodiversity conservation. In addition to this, the government has shown its commitment to implement international agreements relevant to the forest sector.

5.2.2 Forest protected areas and biosphere reserves

The MEFCG GTP 2 has a number of goals related to forest protection. Goal 5 relates to developing a system which ensures environmental safety and forest resource development, protection, and sustainable utilization. The protected area (PA) system in Ethiopia includes national parks, wildlife reserves, National Forest Priority Areas (NFPAs), biosphere reserves and community conservation areas (Young, 2012). There are 22 national parks, 2 wildlife sanctuaries, 2 wildlife reserve areas, 17 controlled hunting areas, 7 open hunting areas, 3 community conservation areas (Annex 5:), 58 NFPAs and 4 biosphere reserves. Although the primary objective of NFPA is to conserve the country's remaining forests, they are extremely valuable in sheltering large numbers of species, including those that are not found in the wildlife conservation areas.

Since 2001, establishment of new PAs is underway in different national regional states. Many more forests are now being designated as protected areas by EWCA and regional governments. For example, Semien-Gibe and Garameba are community conservation areas that are established in SNNP regional state during this period. In Amhara national regional state, Bakussa national park and Menz Guassa community conservation area are among such PAs that are recognized by the council of the national regional state. Surveillance has been completed for other potential conservation areas such as Wof Washa, Guna, and Weleka Abay. In Oromia, Dati Wolel and Arsi Mountains national parks were established within the same period (Young, 2012). Furthermore, since 2001 Ethiopia is working towards improving the status of PAs and re-demarcated seven PAs, including the Semien Mountains, Alatish, Gambella, Kafta-shiraro and Bale Mountains national parks as well as Babille and Sinkele Sanctuaries (Young, 2012). Moreover, clearing of the invasive species and restoration of degraded lands has been carried out in Babille Sanctuary and Yangudi-rasa, Omo, Awash and Nech-sar national parks during the last five years (EBI 2014).



Ethiopia's PAs cover 14% of the country (EBI, 2015). Most existing PAs were established in a limited range of altitude in semi-arid ecosystems. The objectives of wildlife conservation, tourism, research and education largely override the inclusion of the social and cultural aspects. Young (2012) reported that the loss of forests and other PAs is underpinned by the growing population, unsustainable natural resource management, poor enforcement of existing legislation, uncertain land tenure and very low public awareness of the impact of climate change and the importance of biodiversity and ecosystems.

In Ethiopia, very few protected areas have established boundaries and are managed. Only Bale and Semien Mountains National Parks have developed management plans and yet these management plans are not fully implemented. One of the major challenges for these is limited financial, technical and logistic capacities, and lack law enforcement. Furthermore, expansion of large-scale commercial agriculture, other development activities such as road networks and mega development projects such as Gibe III hydroelectric dam, government resettlement programs relocating people in forest areas, increased extraction of wood and other forest products and forest fires are the other challenges affecting Protected Areas in Ethiopia (Bekele et al., 2015).

Currently, Ethiopia has four Biosphere Reserve areas, namely: Yayu Coffee Forest Biosphere Reserve, Kafa Biosphere Reserve, Sheka Forest Biosphere Reserve and Lake Tana Biosphere Reserve. The Yayu Coffee Forest Biosphere Reserve has an area of 167,021 ha and is situated in Oromia. It covers part of the Eastern Afromontane Biodiversity Hotspot and includes bird habitat of global significance. It is one of the last remaining montane rainforest fragments with wild *Coffea arabica* populations.

The Kafa Biosphere Reserve is located in the Kafa Zone of SNNPR and has a surface area of 760,114 hectares. The focus of Kafa Biosphere Reserve is on protection of endemic and globally important genetic resources of *C. arabica* and its associated ecosystems. The Sheka Forest Biosphere Reserve has a surface area of 238,750 ha. It is located in the Sheka Zone, SNNPR and is part of Southwest Moist Montane Forests of Ethiopia. It is important for the conservation of Afromontane forest vegetation types, especially the Afromontane Rainforest and Alpine Bamboo thickets.

Lake Tana Biosphere Reserve is located in Amhara with an area of 700,000 ha (NABU, 2015). It was established with the aim of assisting conservation of landscapes, ecosystems, species and genetic variation of importance at regional and global levels. Further, it is meant to foster economic and human development, and support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues related to conservation and sustainable development (BfN 2012, EBI 2014).



The forest biosphere reserves are divided into three distinct zones: core zone, buffer zone and transition zone. The core zone represents relatively intact forest of high conservation value for biodiversity. It is excluded from any use, except for research and monitoring purposes (ECFF, 2015). The buffer zone is managed by the members of the local community for NTFP production such as coffee, spices, medicine and honey. The transition zone is an area of intensive human activity to improve the livelihoods of the communities living adjacent to the reserved forest resources. In the transition zone, agriculture, grazing, settlement, coffee home gardening, small plantations and some semi-forest coffee production are carried out. There is no legally binding law that restricts communities to access the biosphere reserve except as indicated in the project document. UNESCO also does not have a 'police function' and it is the responsibility of each country to protect its own biosphere reserves (Vreugdenhil et. al., 2012).

5.2.3 Sustainable use of forest biodiversity

Sustainable use is defined as the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining the potential to meet the needs and aspirations of present and future generations (CBD, 2011). Biological diversity (biodiversity) provides a number of ecosystems services such as: the protection of water resources, soil formation and protection, nutrient storage and recycling, pollution breakdown and absorption, contribution to climate stability, maintenance of ecosystems, and recovery from unpredictable events. It also provides biological resources such as food, medicinal resources and pharmaceutical drugs, wood products, ornamental plants, breeding stocks, population reservoirs, future resources, diversity in genes, species and ecosystems along with social benefits such as research, education and monitoring, recreation and tourism and cultural values.

Forest biodiversity plays a vital role in ensuring food security and sustainable livelihoods for millions of households throughout Ethiopia. See Chapters 5 and 7 for more details on the contribution of forests to the national economy and to livelihoods.

Regarding access to genetic resources and fair and equitable sharing of benefits accrued from the access, Ethiopia has recently entered agreements with international and national companies. Some of such efforts include the agreement between EBI and a private USA-based company on access and benefit sharing from the use of *Dichrostachys cinerea*, *Osyris quadripartitum* and *Withania somnifera* for the purpose of producing essential oils, cosmetics and herbal medicine. From the agreement, Ethiopia earned an upfront payment and the agreement stipulates that the benefits accrued from the access of the genetic resources mentioned will be shared equitably between the company and the local communities or the government of Ethiopia (EBI 2014). The benefits are incentives to the local communities or government to conserve and sustainably utilize biodiversity. Moreover, local companies that were using different genetic resources such as Aloe species and *Moringa stenopetala* for various commercial purposes came into legal agreements with EBI for the use of the genetic materials in a way that the agreements enable income generation for the companies as well as the local communities and sustainably utilize the resources base (EBI, 2014).



In Ethiopia, agriculture is the backbone of the national economy. To increase production in agriculture for feeding the ever increasing population and achieve economic growth, growth recorded in the agricultural productivity has, inter alia, been effected at the expense of conversion of natural forests, grazing lands, woodlands, and wetlands. According to MoFED (2011), the scenario in the future is that if the business as usual were to be pursued achieving targets set for the growth of the agriculture sector from 2010 through until 2030, it would require land expansion of 3.9% per annum. Under the business as usual scenario, this will continue to affect forests and their ecosystems in the country, especially the high forest and woodland areas. It has to be noted also that these areas have increasingly been used for settlements, thus threatening the forests of the country, declining species and fragmenting the ecosystems. The consequences of these activities are far reaching ultimately affecting ecosystem goods and services that are directly linked to human livelihoods and environmental sustainability.

5.3 Watershed protection function

Formal and planned development of watersheds in Ethiopia began in the 1980s. GIZ Ethiopia recently published a book on “Lessons and Experiences in Sustainable Land Management.” The watershed development approach includes considerations such as soil erosion, siltation management, flood abatement, water supply improvement, wildlife conservation, fishery protection, forestry and agroforestry management, protection of native vegetation and development of infrastructure (GIZ Ethiopia 2015). This comprehensive view recognizes human presence including the fact that changes in human activity themselves trigger diverse impacts. Thus, watershed protection significantly contributes to forest biodiversity conservation and sustainable use.

Another paramount experience in watershed management in Ethiopia is the local-level participatory planning approach that has ensured success for social protection schemes that provide payment in exchange for work to build public assets, which was implemented by the World Food Program and Ministry of Agriculture (Tongul and Hobson, 2013). The successful Managing Environmental Resources to Enable Transitions to more sustainable livelihoods (MERET) pro-gram concentrated on integrated watershed management. The MERET informed the broader Productive Safety Net Program (PSNP), heralded as a leading example in the fight for food security and inclusive development.

Impact assessment conducted by Tongul and Hobson (2013), showed that the PSNP had the following achievements:

- Reduced sediment in streams by 40-53% in areas where grazing and cultivation are excluded (area exclosures);
- Increased woody biomass and forage production three to four-fold;
- Increased water availability and quality;
- Increased ground water recharge and improved downstream base flow of streams;
- Lessened damage from seasonal floods by soaking up rain water through Closed Areas;



- Enhanced down-stream crop production through soil and water conservation interventions;
- Stored carbon (estimates from just two of several thousand watersheds calculated over a million tons of CO₂ equivalent had been sequestered);
- Increased biodiversity;
- Increased social cohesion by improving livelihoods; and
- Improved access to social services (for example 3,900 schools and 450 health posts have been constructed or refurbished).

The principles and approaches of community-based participatory watershed development and the commitment to community capacity building are now viewed as a model that truly changes livelihoods in severely degraded environments. While MERET leads on physical, biological, soil and water conservation measures, the PSNP scales out natural resource management activities, for example including afforestation and area closures. Both approaches are of sound technical quality and have contributed to environmental improvement. Both the PSNP and MERET have a strong emphasis on national capacity development, national and regional technical training, and community-based participatory planning.

Communities are now more resilient to climate-related shocks and employ a wider variety of preparation and adaptive strategies. When they experience shocks they can generally meet their household food needs and are better able to cope because they have a wider array of income sources and soil and water conservation skills.

This approach to tackling land degradation and food insecurity has evolved with strong leadership from the Ethiopian government through the Ministry of Agriculture, and is well integrated into local and national policy and implementation practices. The Government has extended these principles and approaches to other flagship natural resource management programs, such as the Sustainable Land Management (SLM) program. With the support from various donors and leadership from within the Ministry of Agriculture, the Government has developed and published national community-based participatory watershed development planning guidelines.

5.3.1 Contribution to hydro power generation

Due to deforestation and accelerated erosion, water resources in Ethiopia are severely affected by siltation and sedimentation. If properly managed, the forest resources of Ethiopia have enormous potential to protect hydroelectric dams from siltation and increase the sustainability of power generation. Several dams, streams and lakes have already dried out and many others are drying. Deforestation also increases surface run-off and reduces the amount of rainfall infiltrating the soil and eventually percolating into groundwater aquifers. Poor infiltration leads to low ground water recharge, which leads to low water availability during dry seasons, affecting human and livestock access to water throughout the year. This, in turn, leads to higher peak flows in streams and rivers causing greater flood damage during rainy season. This eventually leads to siltation of hydroelectric dams and serious shortages of electric power during dry seasons in the country.



5.3.2 Sustainable use of the watershed services (PES)

Ecosystems provide society with a wide range of services — from reliable flows of clean water to productive soil and carbon sequestration. Their economic contribution is significant as stated in MEFCC (2016). People, companies, and societies rely on these services — for raw material inputs, production processes, and climate stability. At present, however, many of these ecosystem services are either undervalued or have no financial value at all. As day-to-day decisions often focus on immediate financial returns, many ecosystem structures and functions are being fundamentally undercut. The most comprehensive assessment of ecosystem services to date — the Millennium Ecosystem Assessment, which included over 1,300 scientists from 95 countries — found that over 60% of the environmental services studied are being degraded faster than they can recover (Millennium Ecosystem Assessment, 2005).

PES can be defined in terms of payments to undertake actions that increase the levels of desired environmental services, and can therefore be broadly defined within market-based approaches. PES provides some key opportunities to link up those involved in ‘supplying’ environmental services more closely to those benefiting from the same environmental services. In doing so, PES potentially provides cost-effective ways of developing new streams of financing. This requires considerable innovation as for many environmental services, both ‘suppliers’ and ‘beneficiaries’ may not currently be aware of their roles.

Payment for Environmental Services (PES) is becoming increasingly popular as a way to manage ecosystems using economic incentives. PES is a flexible incentive-based mechanism that has the potential to deliver in both application of policies and incentives to promote the conservation and sustainable use of biodiversity and environmental services, and secondly, a more efficient use of available finance in existing biodiversity programs. Potential water-based PES opportunities could be recognized in Ethiopia, particularly in relation to hydroelectric power generation. Damage to forest ecosystems and unsustainable land use practices in the water-sheds can negatively affect turbines and power generations by increasing siltation of the dam and reducing base flow. However, little research has been done in Ethiopia to provide scientific evidence on the interrelationships between the processes described. Furthermore, there is no institutional awareness among the potential buyers of the services, principally Ethiopian Electric Power Corporation (EEPCO) to streamline PES into the power plant operation business. This means that there is no market for the watershed and/or green/blue water credit at this point in time.

5.4 Barriers to maximizing forest environmental functions

Several anthropogenic and natural factors cause environmental degradation, which in turn influence the ability of Ethiopia’s forest to provide important environmental services. These include habitat conversion, unsustainable utilization, invasive alien species, climate and de-mographic change, poverty, limited financial, technical and technological capacity, and lack of coordination between stakeholders.



The PAs that have been established so far do not represent all the eco-regions of the country and most of the existing PAs lack connectivity. According to Young (2012), they did not yield the expected results as they are increasingly degraded and being converted for subsistence and commercial agriculture, livestock grazing and unsustainable timber and fuelwood extraction. There are various barriers to the PA system in Ethiopia. These include:

- Many of the NFPAs have not progressed beyond the level of a MoANR proposal in the 1980s. The current status of most of the NFPAs is not known but a review of the boundaries overlaid on remote sensed imagery reveals that many have been heavily deforested and/or degraded;
- PA boundaries are not sufficiently demarcated based on underlying human-wildlife conflicts and bush encroachment into PAs;
- Lack of effective benefit sharing mechanisms that motivate community participation;
- Inadequate financial resources;
- Low level of law enforcement;
- Lack of national data base on area coverage and conservation status of protected forests;
- Lack of management plan for protected forests and biosphere reserves;
- Weak institutional coordination among sectoral organizations working both on protected forests and biosphere reserves;
- Lack of knowledge of regional patterns of climate change, especially variability and their specific impacts on forests;
- Lack of technological responses and community organizational skills to mitigate or adapt to impacts of climate change on natural forests, biodiversity and forest-dependent communities.

5.5 Opportunities to maximize environmental functions of forests

In 2014, the Government of Ethiopia requested the UN-REDD Program to support the country in assessing the contribution of forest ecosystems to national income in the context of the national REDD+ process. The primary objective of the project was to establish the contribution of Ethiopian forests to national income (GDP) by assessing the following:

- Value added of the forestry sector: The annual contribution of the production of forest ecosystem goods and services to the national income (GDP) attributed to the forestry industry in the Ethiopian System of National Accounts (ESNA).
- Contribution of forest ecosystems to other sectors: The annual contribution of the production of forest ecosystem goods and services to the national income (GDP) attributed to other industries in the ESNA (for example, the contribution of forest-based insect pollinators to the value added of the agriculture industry or the contribution of protected areas to the tourism industry).
- Non-market benefits: the annual contribution of forest ecosystems to non-market income in Ethiopia (which is conceptually out of scope in national accounting and therefore not included in GDP).



The contribution of forest ecosystems to national income is seen as a necessary element of the case for forest conservation in Ethiopia. To date, an assessment of income from both forest-derived goods and services for the forestry sector and other sectors has not been undertaken. The only statistic available has been the official ESNA estimate (MOFED, 2015) of contribution of the forestry industry to GDP (3.8% in 2012-13). By assessing the full contribution of forests to market and non-market income, a more complete picture of their economic importance emerges.

Ethiopia has been recognized as one of the world's top 25 biodiversity-rich countries (WCMC 1994), and its forest vegetation belongs to the Afromontane global biodiversity hotspots (Mittermeier et al. 2004). The country has two of the world's 34 biosphere reserves (UNESCO 2016). Ethiopia's diverse forests host high biodiversity richness and are of considerable economic and ecological importance not only to the nation, but also to the world.

Despite the management challenges they face, Ethiopia's forests provide essential ecosystem services of considerable economic value to the country (MEFCC, 2016). Opportunities associated with PAs include:

- Now that responsibility for the management of NFPAs has been transferred to Regional State Governments, there is an urgent need to engage with the Regional Governments to assess the status of the NFPAs, prioritize the areas to be protected and initiate appropriate processes, such as Participatory Forest Management to demarcate, gazette (proclaim) and manage.
- Ethiopia's diverse and unique ecosystems and associated diversity in flora and fauna;
- The existence of wildlife policy and strategy, legislations and signed conventions including CBD;
- Political will of the government towards PAs;
- Existence of conservation-driven partners;
- Emerging national initiatives such as REDD+ and CRGE;
- The existence of newly designated PAs in key connectivity areas;
- Ethiopia's commitment to restore degraded forest lands.

There are several opportunities that help conservation, sustainable use and development of the forest sector in Ethiopia. There are already huge efforts for forest ecosystem restoration that are being implemented in different ways such as area closures and massive tree plantings. Increasing forest cover is one of the top priorities of the Ethiopian government, and as a result, its cover has been increased to 15% in 2015 and is planned to increase to 20% in 2020 (EBI, 2015). To this effect, Participatory Forest Management, which is underway in different parts of the country, will inter alia, be strengthened through 2020. Moreover, climate change mitigation activities such as REDD+ and CRGE strategy will be widely implemented.



Increased awareness raising activities with the general public and policy makers on biodiversity, mainstreaming of forest related activities into different sectors, sound institutional setup, timely revision of the NBSAP 2015-2020 that are aligned with the international Strategic Plan of Biodiversity Targets 2011-2020 and the realistic national targets and implementation arrangements are some of the major opportunities related to the Ethiopian forest sector.

The NFSDP could spark an economy-wide paradigm shift in Ethiopia as investments in the forest resource base will be combined with manufacturing and value adding to ensure sustainably and domestically produced forest and wood products replace energy-intensive materials in Ethiopia's growing economy. For instance, afforestation/reforestation (A/R) interventions on degraded forestlands can sequester and store significant amounts of carbon. The sustainable management of forests, woodlands and bamboo stands can also sequester carbon as compared to the current management techniques. Such interventions can improve the resilience of millions of vulnerable people in rural areas by providing employment and other livelihoods benefits through the adoption of forestry, agroforestry (wood/fodder/fruit trees with beekeeping and poultry) and energy saving technologies. These interventions also support adaptation to climate change, as described in Chapter 6.

Numerous past and present successes in the Ethiopian forest sector demonstrate that investments in forests and accompanying value chains are transformational in building low-carbon green-economy while improving the resilience of vulnerable community and ecosystems to climate change impacts.

5.5.1 Payments for Environmental Services

There are significant opportunities for Ethiopia to become further engaged in PES related to the forest sector, especially given REDD+ is a form of PES. In addition to the national REDD+ strategy currently under development, Ethiopia is developing a subnational jurisdictional REDD+ program for Oromia regional state.

With regards to PES schemes related to hydropower generation, the following opportunities have been identified:

- There is a possibility to integrate PES with strong enforcement of management rules and regulations. This is vital particularly in the case of hydroelectric power generation and 'commercial forest' like coffee forests.
- There are initiatives for raising funds at local and national levels to finance PES in addition to international sources.



5.5.2 Climate Change

Since its establishment, ME FCC has been working to implement CRGE strategy. One major sectoral effort of the ministry since its establishment has been the effort to realize the national REDD+ readiness program. As one of the four CRGE pillars, the projected increase in forestry-related GHG emissions must be reversed in order for the country to meet its green growth goals. This is for two reasons: first the sector is the second largest emitter of GHG in the country, contributing 55 million tCO₂e (37%) to the total 150 million tCO₂e GHG emission in the country in 2010 (CRGE, 2011). Under the business as usual scenario the sector's emissions will grow to 90 million tCO₂e in 2040, and this therefore has to be reversed to achieve green growth. The sector's abatement potential is estimated at 130 million tCO₂e (FDRE 2011). The forest sector strategies included in the CRGE are:

- Reduction of natural forest and woodland deforestation to zero;
- 3 million ha new forest development (2 million ha Afforestation and 1 million ha Reforestation);
- 3 million ha forest management (2 million natural forest and 1 million woodland), and
- 1 million ha rehabilitation of degraded lands.

A similar target has been set for the forestry sector in the GTP II document (2015-2020). Forest sector targets in GTP II are:

- Area enclosure (rehabilitation of degraded areas) = doubling from current 10.86 M ha to 22.5 M ha;
- Forest sector GDP contribution = doubling from 4% to 8%;
- Forest cover = increase from 15.5% to 20%: planting more, rehabilitating degraded forests and forest areas.

To better prepare for, and respond to the likely impacts of climate change there is a need for more investment to:

- Understand the long-term trends, and increased variability in local climate in each major eco-region, and their impacts on forest biodiversity, ecosystem functions, and forest based livelihoods.
- Develop technologies and management responses that enhance adaptation of natural forest and plantation management to climate change.
- Build the capacity of national, regional and community level institutions to adapt forest management practices to climate change, including their organizational development, technical skills, etc.

6 Forests and Rural Development

6.1 Contribution of forestry sector to livelihoods

A valuation study on the contribution of the forests of Ethiopia showed that they generated economic benefits in the form of cash and in-kind income equivalent to USD 18.1 billion (120.7 billion Ethiopian Birr (ETB)) in 2012-13 (MEFCC 2016). The largest market income benefits were associated with flows of wood fuel and livestock fodder. The same study estimated the contribution of the forest sector to the GDP to be about 6.1%, which is nearly twice the current official statistics of the sector's contribution, i.e. 3.8% (MOFED, 2015).

Moreover, the forest sector, through the provision of several ecosystem services, is contributing to other sectors – particularly agriculture, which is estimated to be 7.9% of the GDP. Both combined, the forest sector is estimated to have contributed 14% of the measured value of gross domestic product (GDP) in 2012-13 (MEFCC 2016).

The recent MEFCC study first mentioned in Section 3.2 of this report estimated 43.4 billion ETB as the value added of fodder to the livestock sector freely obtained from the environment – i.e. from either grazing in forests or on grasslands of which about 20.0 billion ETB was from forest-derived fodder in 2014-15.

The MEFCC study estimated that wood fuel value added was 39.1 billion million ETB (USD 5.9 billion; 4.5% of GDP) in 2012-13. Of this, 32.0 billion ETB was in-kind income for households that collect and use their own wood fuel. The remaining 7.1 billion ETB represents cash income to households that sell wood fuel products (firewood or charcoal). Together, wood fuel and fodder accounted for 62% of forest use benefits of USD 10.3 billion (69.0 billion ETB).

In addition to wood fuel and fodder, the study identified that roundwood supply (11.4% of use benefits); forest coffee production (10.8%); control of cropland erosion (6%); pollination of crops by forest insects (4.5%); forest honey/beeswax production (1.5%); and collection of wild medicinal plants (1.1%) were all important sources of forest-derived income.

Wood fuel: Nearly 95% of the nation's energy consumption comes from biomass fuels – of which wood fuel is the most important, providing an estimated 68% of the total (FDRE 2015).

Fodder: The economic importance of fodder in Ethiopia has already been presented above. Several studies on multi-purpose fodder trees (MPFTs) have been conducted in different parts of Ethiopia (Yadessa et al. 2000; Chibssa et al. 2006; Tolera A. 2007; Tadege, G.A., 2007; Mekoya et al. 2008; Haile and Tolemariam, 2008). However, most deal with introduced or exotic fodder tree species and very little information is available on the socio-economic values of indigenous MPFTs, despite their importance as resources. A study by Takele et al. (2014) showed that indigenous MPFTs were used to ameliorate food scarcity during the annual dry season. The results indicated that indigenous MPFTs have important social, economic and ecological functions, such as food supply, shade, traditional medicines, bee forage and the preservation of milk, animal nutrition, and contributing to household income.



Non-Timber Forest Products: Use of NTFPs such as honey, medicinal and spice plants, fodder, and the benefits of environmental services are essential aspects of people's livelihoods. Edible wild plants play a critical role in ensuring food and livelihood security for countless families and communities around the world (Teketay et al. 2010). More than 300 species of wild trees, shrubs and forest plants have been recorded as important traditional food sources in Ethiopia (Zemedede and Mesfin 2001, Teketay et al. 2010). Such NTFPs are harvested by local communities for cash income and subsistence, forming part of the diet of farm households not only during periods of food shortage but also on a daily basis.

NTFPs provide a number of important dietary elements that the normal agricultural production fails to provide adequately. During the increasingly frequent times of stress (such as drought, crop failure, pest and disease outbreaks), edible wild plants serve as major sources of food (Teketay et al. 2010). Consumption of wild plants is a necessary strategy adopted by rural communities in order to survive in harsh environments and periods (Guinand & Lemessa 2001, Neudeck et al. 2012, Teketay et al. 2010, Seyoum et al. 2015). For instance, many pastoralists rely on the seasonal products of natural forests, woodlands, and bushlands. Hence, the consumption of wild plants seems more common and widespread in food insecure areas, including most dryland areas, where a wide range of species are consumed, leading to the notion of “famine-foods” or plants consumed only at times of food stress (namely drought, war, and other hardship periods) (Guinand & Lemessa 2001, Teketay et al. 2010). Increasing dependence on NTFPs during more frequent times of stress is also likely to increase pressure on such resources.

In the Bale Mountains, NTFPs provide around 50% of household annual income (Andargatchew 2008, Aliyi 2008). In Gore District, 88% of households collect NTFPs, from which 23% of their average annual income is generated (Debela 2004). In Walmara District, beekeeping contributed between 12 and 82% to household income, depending on the wealth of households (Lemesa, 2006). In Dendi District, the Chilimo forests contribute an average of 39% to annual household income, approximately equal to agriculture, which contributed 40% (Mamo et al. 2007). Forest income was more important according to this study than all other income sources combined for the poorest 40% of households and contributed more to household income than agriculture for 65% of households.

Melaku et al. (2014) studied the contribution of major NTFPs (forest coffee, honey and spices) to household incomes in 900 households in the Bonga forest area of Gimbo and Decha Districts of Kaffa Zone, southwest Ethiopia. According to this study, NTFPs accounted for 47% of annual household income.

Seyoum et al. (2015) interviewed 90 respondents from households in Arsi Zone, Central Ethiopia, and identified 30 species of edible wild fruit trees and shrubs. Of those interviewed, most recognized a trend of resource depletion over time. About 54% of the respondents planted edible wild fruit trees and shrubs, while 87% showed interest to participate in domestication programs.

Non-timber forest products: Ethiopia produces several NTFPs from its forest and woodlands. NTFPs of high economic value include natural gum and incense, honey, beeswax, civet musk and spices. Trade in NTFPs is an important generator of foreign currency for the country. Their production and trade also generates employment and contributes to rural household incomes, hence contributing to rural livelihoods, food security and development.

Forest coffee: Ethiopia's tropical rainforests are known as the birth place of coffee (*Coffea arabica*). This explains the strong interaction between forest management and coffee production. Current coffee production can be classified into three production types: forest coffee (which can be divided into true forest and semi-forest types), garden coffee and plantation coffee.

Forest coffee is harvested from naturally growing wild coffee plants from intact forest and semi-managed forest systems. The latter refers to a production system where coffee is harvested from slightly modified forest ecosystems (Abebaw and Virchow, 2003). The coffee is unmodified genetically except the forest is thinned slightly to increase coffee stem density. Estimates show that 35% and 10% of total coffee production in Ethiopia comes from semi-managed forest coffee and wild forest coffee production system, respectively. The volume of forest-derived coffee production is compiled in Table 15.

Table 15: Forest-derived coffee production, export quantity and value

Year	Semi-forest and forest coffee production (45% of total coffee production)	Export quantity* (45% of the total exported quantity)	Export value (USD)
2007	172,029	70,372	183,768,745
2008	94,397	79,889	248,239,970
2009	132,815	58,526	162,711,226
2010	150,370	95,303	304,123,507
2011	143,132	159,121	836,178,302
2012	146,008	91,546	395,302,208
2013	203,813	77,873	272,793,143
2014	207,253	88,300	352,822,118

*Assuming the exported coffee also comprises 45% of forest coffee similar to the production proportion.
Source: ME FCC 2016 & ERCA

Honey: Ethiopia has a long history of traditional apiculture. Apiculture is an important livelihood activity and source of cash income for many rural people. There are approximately 1.5 million beekeepers in Ethiopia, and 8 - 10 million bee colony hives (ME FCC 2016). The majority of honey produced in the country is through traditional beekeeping methods, mostly in natural forests and woodlands. In the less forested areas of the country, traditional beehives may be placed in backyards and bee colonies may forage on agricultural crops or other non-forest flora.



Forests contribute to the apiculture industry in two ways. Firstly, they provide raw material for the construction of hives, and secondly, they provide bee forage (pollen) for the hives. Smaller amounts of wild honey is hunted and produced in the forests of Ethiopia.

Ethiopia is Africa's largest honey producer and ranks ninth in the world with a current national estimated production of 43,700 metric tons per year (USAID, AGPAMD, 2012). About five per-cent of honey produced is consumed at home by rural households, 80% goes to the tej sector, and 15% is marketed as table honey (both domestic and export). According to the Ethiopia CSA, the major honey and beeswax producing regions in Ethiopia are Oromia (41%), SNNPR (22%), Amhara (21%) and Tigray (5%).

Honey production and export is summarized in Table 16. According to this table, Ethiopia exported a very small fraction of honey, although the export volume is increasing over time. This is perhaps due to the poor quality of honey owing to its traditional production system.

The potential for honey production in Ethiopia is estimated at ten times its current size (Yadeta 2014). This potential needs to be tapped through proper market integration and production quality enhancement while maintaining the organic forest-based production system.

Table 16: Production and export of honey

Year	Quantity produced (tons)*	Quantity exported (tons)**	Export value (USD)**
2007	42,180	387	1,090,497
2008	42,000	196	530,242
2009	39,660	274	880,195
2010	41,529	615	2,106,453
2011	39,891	729	2,409,375
2012	53,675	727	2,687,152
2013	39,892	883	3,021,353
2014	43,800	798	2,625,276
2015	48,711	618	2,129,847

* Data collected from various sources including FAOSTAT.

** Data from ECRA

Beeswax: Similar to traditional honey production, Ethiopia produces a large quantity of beeswax, the majority of which is exported. Several sources indicate an average annual production of approximately 3,000-3500 tons of wax in the country. Production data obtained from FAOSTAT is presented in Table 17. Data obtained from ERCA shows that an average of 369 tons/year of beeswax has been exported since 2007.

Table 17: Export of beeswax and its value

Year	Estimated production (ton)*	Export: Quantity** (tons)	Export: Value** (USD)
2008	5,150	374	1,706,047
2009	4,600	360	1,658,403
2010	5,150	311	1,517,743
2011	5,000	358	1,886,359
2012	5,000	348	2,219,450
2013	5,000	341	2,538,134
2014	ND	443	3,773,648
2015	ND	416	3,813,083

* Based on FAOSTAT; Export data is from ERCA database

** Data obtained from ECRA

Natural gum: Ethiopia's dry forests, which include *Combretum-Terminalia* and *Acacia-Commiphora* woodlands, contain an abundance of gum and resin producing tree species such as *Acacia*, *Boswellia* and *Commiphora*. Production data obtained from MEFC 2016, and export data from ERCA databases are presented in Table 18. The data shows that frankincense of Tigray type, i.e. from the species *B. papyrifera*, dominate production. Export data shows an overall declining trend, and so does value of the export.

Table 18: Production and export of natural gums and resins

Year	Tigray type olibanum	Other gums and resins	Gum Arabic	Total production	Export quantity	Export value
	Tonnes					USD
2007-08	9,200	500	700	10,400	4,533	6,486,038
2008-09	7,400	400	500	8,300	3,550	7,942,418
2009-10	7,700	400	500	8,600	3,606	10,310,780
2010-11	8,500	400	1,800	10,800	4,478	13,051,120
2011-12	8,500	400	1,200	10,100	4,051	12,429,007
2012-13	7,000	400	700	8,000	3,105	10,678,848
2013-14	7,900	400	900	9,200	3,711	12,636,783
2014-15	ND	ND	ND	ND	2,971	10,561,285
2015-16	ND	ND	ND	ND	3,082	10,188,734

Source: MEFC 2016 & ECRA

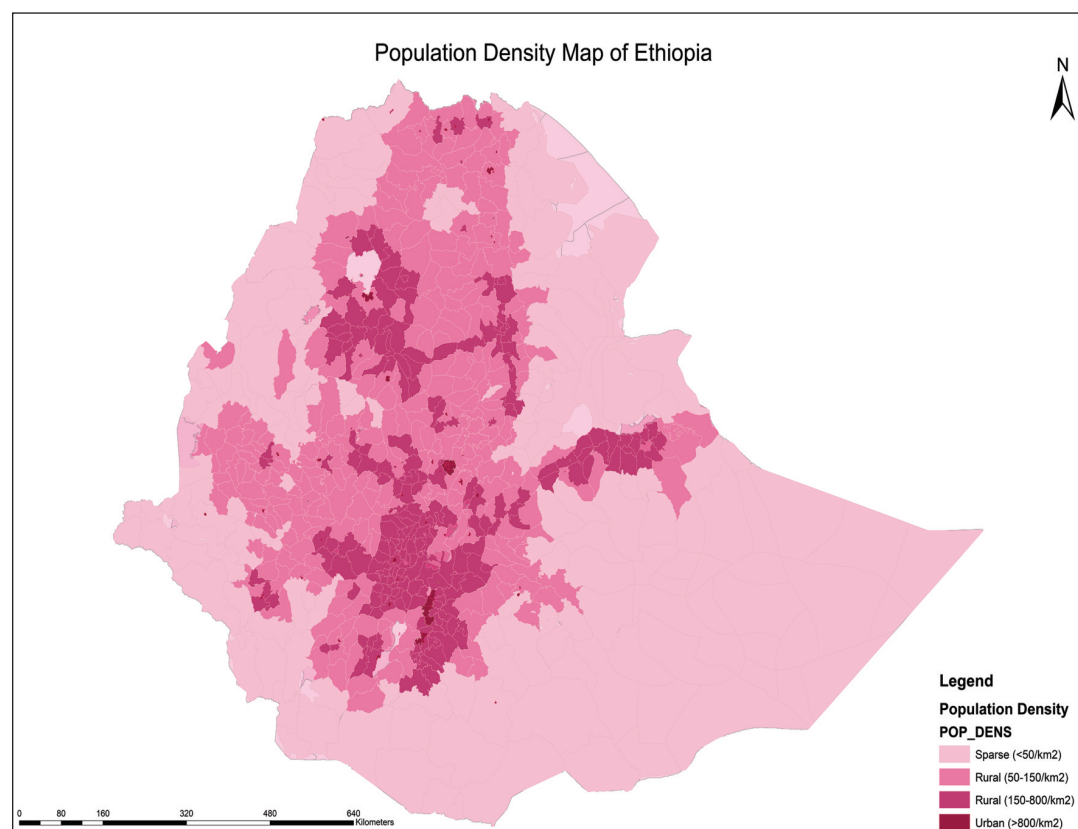


Tree farming: Cash income from tree farming is the main incentive driving tree planting throughout rural Ethiopia (Teklay 1996; Asnake 2001; Toru 2002; Negash 2002; Mekonnen et al. 2007). Private tree farming is a growing source of household income in Ethiopia. Eucalyptus farming contributes up to 25% of household cash income in the northern, central and southern highlands, where natural forests have been impoverished (see e.g. Teklay 2006, Teshome 2004, Mekonnen et al. 2007) and tree farming is even competing with agriculture, with farmlands being converted to woodlots.

6.2 Forest Sector Employment

Ethiopia's population is projected to reach 94.3 million by 2017(CSA ,2013) which is concentrated in the highlands (see Figure 22). Based on a case study of an industrial timber plantation, Ethiopia conforms to the global pattern of plantation employment — with low wages and reliance on casual jobs without formal contracts in a rural context of a weak labor market with few employment opportunities.

Figure 22: Population Density



Source: WRI (2016).



Rural employment in agriculture reduced from 80% in 2005 to 77% in 2013 (World Bank 2016). In the GTP II, it is planned that the contribution of agriculture to GDP (including forestry) should be reduced from 41% to 35.6%, as the share in industry should increase. The proportion of the total that derives income from forest resources or direct employment in the forest industry is rarely reported. In 1988-89, EFAP (1992) reported that forest industry employment amounted to about 2.2% of the total work force in the country and contributed 2.8% to employment in the agricultural sector. Teketay et al. (2010) report that official estimates put forest sector employment at 0.29% of the total workforce, but underline that this estimate ignores the many thousands of people employed in the informal sector, including the 35,000 women involved in the fuelwood trade in Addis Ababa alone, of which most (82%) are fully dependent on the business (WISPP 2004). Fuelwood production (firewood collection or charcoal production and sales) is by far the largest employment generator accounting for nearly 50% of the total forestry employment, followed by afforestation contributing for about 34% (Bekele, 2001).

Forest nursery operations, planting and construction and maintenance of roads — driven by afforestation programs — create a major source of income for rural communities. NTFP collection is also an important activity that generates employment and income (see Section 6.1).

6.3 Sustainable Land Management and link between agricultural productivity and deforestation

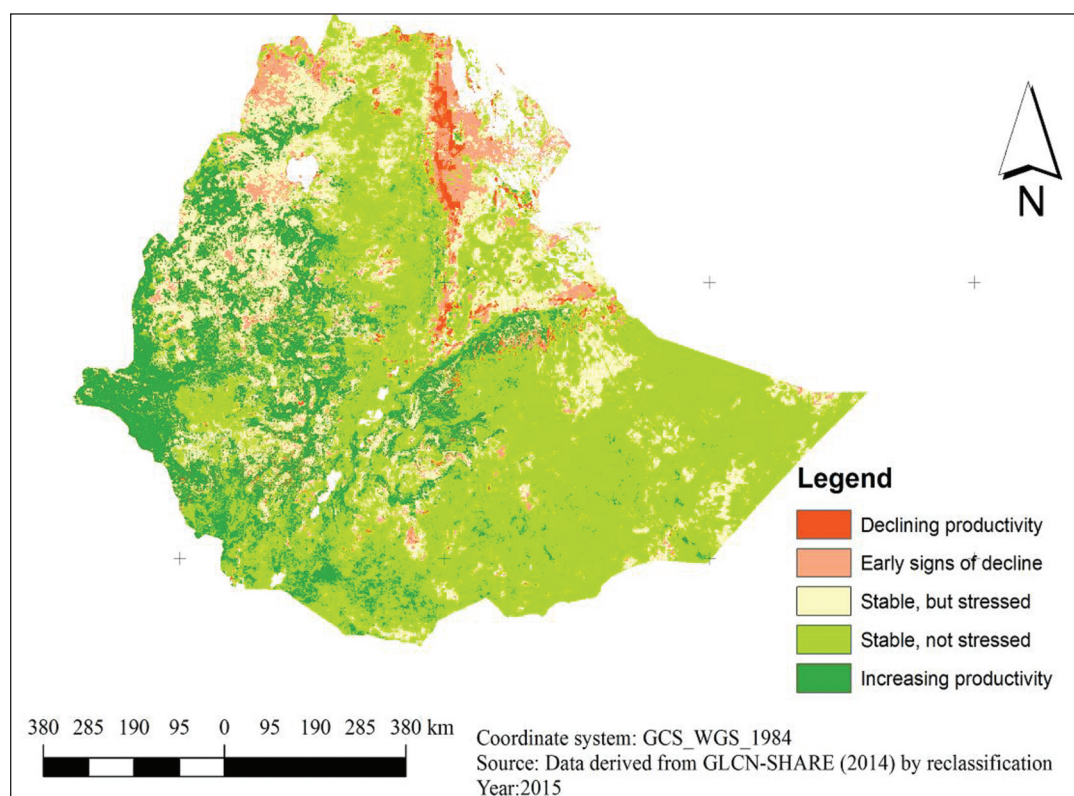
Soil degradation in Ethiopia can be seen as a direct result of past agricultural practices on the highlands. The dissected terrain, includes extensive areas with slopes above 16%, and the high intensity of rainfall leads to accelerated soil erosion once deforestation occurs. Additionally, some of the farming practices within the highlands encourage erosion. Land degradation and desertification are mainly caused by land mismanagement, such as intensive agricultural practices, inappropriate use of irrigation, overgrazing, deforestation or urban sprawl. This is further driven by underlying forces such as weak implementation of policies, national and international market demand, and poverty. The lack of efforts to protect the land will have enormous impacts on food security (Nikonya *et al.*, 2011), climate, human and environmental health (Safriel and Adeel, 2005). The economic consequences are increasingly recognizable as ecosystem services are lost when land is kept degraded. Appropriate land management is crucial to achieve economic growth, improve biodiversity, create sustainable agricultural systems, attain food security, eradicate poverty, address climate change, and improve water availability (UNDP 2012). Forests provide livelihood opportunities for local populations and contribute to food security, climate change mitigation and adaptation, as well as the protection and enforcement of natural capital (Mbow *et al.*, 2014). Forest restoration strategies include rehabilitation to restore species or communities and ecosystem processes and reclamation to re-vegetate severely degraded landscapes (Stanturf *et al.*, 2014).



In Ethiopia, the integration of trees and shrubs into agriculture has developed during subsequent millennia into a number of indigenous agroforestry systems that provide food, livelihoods and income for smallholders and local communities. Forests support sustainable agriculture through the provision of fertile cropland and support through services such as pollinators, biological controllers, gene pool for crop improvement, watershed protection, organic fertilizer, farm implements, fodder and bee forage. For example, fodder supply from forests and woodlands amount up to 65% in the dry lands (Lemenih 2009). Moreover, biomass transfer, organic inputs and nutrient cycling services from on-farm trees in the traditional agroforestry systems is playing a significant role in sustaining the agricultural production systems in Ethiopia. Parkland agroforestry systems were proved to improve soil fertility and crop yield in different parts of Ethiopia. Multistory home garden agroforestry systems were found to provide ecologically and socio-economically sustainable agricultural production systems by improving species diversity. For example, the enset-coffee based home gardens in the Sidama zone of southern Ethiopia have high species diversity. Most of them evolved from forests, where farmers maintain the upper story trees and clear the understory vegetation to open up space for planting enset, coffee, and other food and cash crops.

The provision of fertile and productive lands for crop production is among the most important role the forest sector is playing in Ethiopia. Ethiopia's economy has long been dependent on subsistence agriculture. The sector employs over 85% of the population, many of whom reside in rural or pre-urban settings. Agriculture is land based, and subsistence agriculture is more so since its sustained production relies on horizontal expansion of land into fertile natural ecosystems more than intensification. In such a system, it is not only a growing rural population that demands cultivable land but even at low population pressure rapid, soil fertility loss results in the frequent clearing of forest lands. Forest lands are the first target in the process of conversion and obtaining crop lands because they are the most fertile and offer high yield return per area and labor (Lemenih 2009). Therefore, forests in Ethiopia have been sources of fertile crop land upon clearance for millennia. Forests are also used as fallow crops to rejuvenate degraded soils and put land back to production. They also harbor many beneficial insects that assist crop pollination. Bees, butterflies, beetles, bats, and other animals transport pollen, the male reproductive structures, from one plant to another, with enormous benefits to humanity.

The FDRE (2015) report to UNCCD within the context of the Land Degradation Neutrality Project estimated trends in land productivity over 15 years derived from VGT NDVI from 1998 to 2013 (Figure 23). Despite the loss of 4,277 square kilometers of forest in that period, the figures show that in terms of land productivity, the trend is not all negative. Instead, 18% of Ethiopia's land surface shows increasing land productivity over the observation period; 49% of the land surface is considered to be stable and not stressed. Of Ethiopia's land surface 20% appears stable but stressed; and 7% of the land surface shows early signs of declining land productivity and only 1.5% shows a clear trend of decreasing productivity (FDRE 2015).

Figure 23: Overview map of distribution of land productivity trend classes in Ethiopia

Source: Ethiopia - Land Degradation Neutrality National Report to UNCCD. Federal Democratic Republic of Ethiopia (2015).

Traditional agroforestry systems such as home gardens are among the oldest forms of land use and are highly sustainable (Kumar and Nair 2004). They have recently been regarded as germplasm banks for economic crops and a key site for the domestication of wild plants. The indigenous agroforestry systems of the southeastern part of the Rift Valley escarpment in Ethiopia are not only productive, providing food and livelihood, and protective of soil and watershed, but are also important sinks for carbon. The carbon stocks of these indigenous agroforestry systems are substantially higher than those of tropical forests and other agroforestry systems (Mesele Negash and Mike 2015). The high diversity of species in these systems contributes to conservation of species, nutrient recycling, soil fertility improvement, biological pest control, soil and water conservation; year round production of different crops; and reducing risks. The preservation of woody species in such cultivated landscape could contribute to productive farming, biodiversity conservation and supply of farmers' requirements for various wood products, thereby reducing the pressure on remnant forest in the area.



The first forest laws in Ethiopia were established by Emperor Menelik II of Ethiopia at the end of the 18th or beginning of the 19th Century. There were also referred to as “Menelik II forest laws”. While Menelik II proclaimed that all forest trees on private or state land belonged to the Government and anyone who uses them should pay royalty to the Government, with the proclamation of a civil code in 1960, royalty payment on trees on private lands was exempted (Me-konnen and Bluffstone, 2008). Menelik’s Forest laws were abolished and royalty payments were limited only for trees on Government forestland. Owners of private forest would pay only land tax and provisions of fund called reforestation security deposit on contract, which would be reimbursed after reforestation on felling sites had been carried out. This was, however, poorly implemented due to lack of regulated management practices and capacity. Orders to preserve all state forests from distribution to private owners and provisions to exchange forests already on private lands against bare land seem to have increased the fear that all forests would eventually fall under state control and led to significant deforestation (von Breitenbach 1962 cited in Demel, 2004).

Major afforestation and soil conservation programs were implemented in the second half of the 1970s and during the 1980s. These plantations belonged to the government and the labor contribution of the local communities in the establishment of the plantations and soil conservation structures was mainly financed through food-for-work⁸. Most of the plantations were destroyed⁹ in the early 1990s either during or immediately after the change of government in 1991 (Admassie, 1995; EFAP, 1994a).

The Ethiopian Forestry Action Program (EFAP) was produced in 1994 under the Ministry of Natural Resource Development and Environmental Protection, which was established in 1991. EFAP was implemented through four primary and four supporting development programs. The primary programs developed to directly address forestry development objectives were Tree and Forest Production Program; Forest Resource and Ecosystems Management Program; Forest Industries Development Program; and the Woodfuel Energy Efficiency Development Program. The supportive development programs developed to back up the primary programs were Technology Development and Dissemination Program; Sectoral Integration Program; Planning, Monitoring and Evaluation Program; and Human Resources Development Program.

There was, however, very limited success in terms of implementation of these programs as funding was limited and the Ministry of Natural Resources Development and Environmental Protection was unified with the Ministry of Agriculture and restructured as the Natural Resources Management and Regulatory Department under which Forestry and Wildlife Conservation and Development was a team (Bekele, 2004; Tekete, 2004).

⁸ This was largely financed by UN-WFP and the value was estimated to be slightly over half a billion USD over the 1975-1990 period. (Admassie, 1995).

⁹ After the change of government in 1991, the plantations that survived were transferred to local communities. However, most of these were also destroyed due to a lack of proper rules and regulations on their management and use (Admassie, 1995).



Critical questions regarding resource governance underlie the potential for sustainable management of the forest and woodland estate in Ethiopia. Ethiopian and international forestry experts stress the need to distinguish forest tenure issues from those of land and land policy and address issues that are pertinent to forest management and use. In particular, there is a need to assess the policy environment and enabling circumstances of the evolution of community forest management and to clarify land and forest-use rights in forest areas (Bane et al. 2007).

In some forest areas, robust, complex customary rules and practices governing forest utilization persist, despite continuing claims of exclusive authority by some government forest authorities. Perceived insecurity of tenure, including restrictions on transfer rights and the potential for government seizure of holdings was found to have a robust negative impact on farmers' willingness to invest in perennial crops such as chat and coffee, as well as the planting of trees (Stellmacher and Gatzweiler 2005; Dercon and Ayalew 2007).

The rural land registration implemented in Ethiopia from the start of the last decade is one of the world's largest land programs, with a major goal to improve land tenure security. In the framework of the evolving Government programs, the Regional States began a process of providing "simple" temporary landholding certificates, known as Stage 1 of the certification process. Under Stage 1, farmers receive temporary certificates with no geo-referencing or map-ping of land parcels. Through this process land certificates were issued to 6.3 million house-holds out of a total of 13 million rural households in the four major Regional States — Amhara, Oromia, Tigray, and Southern Nations, Nationalities, and Peoples (SNNP). The Government's target was to provide Stage 1 certificates to the remaining 6.7 million households and to scale up for a successful 1 million households land administration pilot issuing permanent certificates, with geo-referencing and mapping of individual land parcels. This land administrative work is referred to as the second stage or Stage 2 of the certification project.

A number of projects have been concluded or are on-going to improve land administration in Ethiopia. Some of these are summarized in Annex 2.

In some of the ongoing programs, the land certification process aims also to register communal land and forested land — whether it belongs to the state or local communities under customary tenure. This is a welcome development.

6.4 Participatory Forest Management

Participatory Forest Management (PFM) combines objectives of sustainable forest management with secure rights, local forest governance and secure livelihoods for local communities. The fundamental argument behind PFM coincides with its potential to remedy the past failures in natural resources management practices — which were characterized by top-down approaches, an absence of community participation and failure to recognize the multiple social, economic and ecological values of forests both for sustainable livelihood and poverty reduction (Ameha et al. 2014).



In 1995, Farm Africa/SoS Sahel launched a pilot PFM project in Chilimo and Bonga, and demonstrated how PFM projects could be implemented successfully and indicated the potential of the approach for positive impacts on forest conditions and rural livelihoods. Trust in communities' accountability and ability to manage forests grew and broad recognition and acceptance of the approach increased systematically at all levels of government. At the same time, the Governments of Germany and Ethiopia have collaborated to implement the Integrated Forest Management Project, which supported a community forestry trial project in the Adaba-Dodola Forest Priority Area. Due to the support from the above-mentioned pilot projects, Oromia became the first regional state to formally recognize PFM in 2000, by forging formal agreements with communities (Farm Africa 2016). Moreover, many PFM actors (including JICA, EthioWetlands, Natural Resources Associations and others) had been implementing PFM under slightly different modalities.

The widely held belief that deforestation was driven by poor farmers seeking to increase production through an expansion of their land assets led to increased efforts to increase the productivity of agricultural land as a means of diverting farmers' attention from forests. However, initial efforts to tempt away farmers from forests by generating greater income from agriculture proved counter-productive as they intensified deforestation to further expand agricultural land (Temesgen et al. 2007, Temesgen and Lemenih 2011). It thus became clear that, if forests do not represent an economic asset, they are not managed well. Promoters of the PFM model responded to this challenge by refocusing efforts on 'making forests pay'. In this revised approach, forests are now actively managed, rather than protected, and communities are granted legal rights to produce and market forest products on a sustainable basis.

Today PFM is formally recognized, in forest proclamations of Ethiopia's Federal Government (Proclamation No. 542 of 2007) and several regional states. The approach has expanded significantly and the government is committed to scale up the approach further. Farm Africa's data (Temesgen and Lemenih 2011) suggest that nearly 40% of the country's forest resources, mainly the high forests, are now under some form of PFM although Winberg (2010) is more cautious.

Close to 1.5 million ha of natural forests are currently managed through PFM arrangements (Farm Africa 2015). There is evidence that demonstrates the contribution of PFM in reducing deforestation and forest degradation and enhancing the social and economic importance of forests (Box 4). However, much room for improvement remains for PFM in Ethiopia to realize sustainable forest management.

The formal harmonization of the approach across actors and programs represents a key mile-stone in the evolution of PFM in Ethiopia. Many PFM actors (including Farm Africa/SoS Sahel, GIZ, JICA, EthioWetlands, Natural Resources Associations and others) had been implementing their own approach to PFM. Recognizing that such lack of coordination could ultimately jeopardize the ability of government to scale up, a national PFM Task Force was formed. With guidance from the MoANR and key PFM stakeholders a harmonized national guideline was prepared that is in use by many practitioners today.



The Guideline for Participatory Forest Management in Ethiopia (2012) consolidates the different approaches of PFM being introduced in the country and provides a more refined and simplified approach that could easily be taken up by key PFM actors and scaled up in their working. The guideline targets forestry extension workers who facilitate a PFM planning process in their locality and for woreda and zonal forestry professionals to facilitate the establishment and implementation of PFM.

The promotion of PFM as a mechanism for sustainable forest management has received significant attention in the policy process, and in 2010 a national PFM scaling up program was initiated. There is growing interest to include PFM as a mechanism for REDD+ policies (Ameha et al. 2014). Yet while most studies have noted the positive impact of PFM on forest conservation and livelihoods, few advance dialogue on how and under what conditions PFM approaches appear to have worked best, including some of the underlying constraints to scaling up and applications to REDD+ objectives.

Gobeze et al. (2009) analyze the experience from Farm Africa's Bonga PFM project after about 15 years of implementation. They conclude that PFM had positive impacts both on the state of the forest and living conditions of participant households at least within the project lifetime. Forest conditions such as seedling and sapling densities improved. PFM also (i) promoted awareness about forest, (ii) capacitated locals to form new institutional arrangements that increased their participation in forest management, helped to reduce open access and assisted a regulated forest use, and (iii) contributed towards social equity in terms of gender and minority ethnic groups. When accompanied with complementary non-forest based livelihood activities, PFM helped to diversify income sources, increase household income level, and build household assets. This reduced dependence of communities on forests for livelihoods.

6.5 Lessons learnt from Sustainable Land Management

Although there have been several efforts made to reduce land degradation and improve land productivity in Ethiopia, farmers' investments in SLM remain limited (Adimassu et al. 2015).

There is a long and rich tradition of empirical research that seeks to identify the determinants that affect farmers' investments in soil and water conservation practices. However, understanding of the determinants of farmers' investments in SLM has been inconsistent and remains scattered. Three main determinants that affect farmers' investments in SLM practices are (ibid.):

1. **Farmers' capacity to invest in SLM practices**
2. **Farmers' incentives for investments in SLM practices**
3. **External factors beyond the control of farmers:** Creating enabling conditions for enhancing farmers' investment capacities in SLM and increasing the range of incentives from their investment is crucial to encourage wide-scale adoption of SLM practices.



The importance of tenure security: According to Hepworth (2012): “A lack of security over forest access and use leads to unsustainable exploitation, rather than use based on stewardship; a reluctance to invest in the improvement of smallholdings including tree-planting, soil improvement and water conservation measures; and resultant pressure on forested land, either for timber products, charcoal and firewood, but more significantly for additional agricultural land.”

There is growing evidence that land tenure security can mitigate land degradation. A review of Ethiopia’s Stage 1 certification project (Deininger et al. 2007 and 2009) concluded that the large majority of beneficiaries perceived certification as likely to increase their incentives to invest in trees, soil and water conservation structures, and sustainable management of common property resources. Based on household surveys, the review estimated an average 30% rise in investment in soil and water conservation measures among smallholders and more than double the number of hours spent on such activities. Participants in the survey attributed the greater investment to the security of tenure gained from land certification, which encouraged better custodianship of the land. GoE awareness raising campaigns and development partner supported programs have undoubtedly also contributed to this success.

The importance of proper documentation: The study also identified the following areas for improvement: (a) improvement in procedures and systems for updating information; (b) registration of common property land and house plots to facilitate the creation of an integrated land administration system; and (c) a graphical record of land holdings needs to be created to minimize boundary disputes.

Effective land use planning to conserve forests and natural resources is also undermined by inaccurate land registers (Hepworth 2012).

Lessons learnt from SLMP I (adapted from World Bank, 2013): The demand-driven bottom-up approach adopted under the SLMP Phase I is relevant for natural resources management and local development in Ethiopia’s rural set-up. This development approach in which communities steer affairs, have a voice in determining priorities and are actively involved in project identification, planning, development and implementation has contributed to generate ownership and is greatly valued by both beneficiary communities and local authorities.

Similarly, it is important to provide enhanced support to technical design and implementation issues regarding physical and biological [landscape] rehabilitation practices, business development and planning, off-farm income generation, climate finance mainstreaming, market intelligence as well as providing options for solutions to identified development problems.

The need to build sustainable institutions at the local level can never be over-emphasized since they are crucial for delivery of service and attainment of project objectives. Lessons from SLMP-1 show that where local level implementation structures are established and sustained through targeted capacity building and reward and incentive schemes, implementation of project activities was more effective in terms of quantity and quality.



Active engagement of local government (woreda) leadership in SLM project management and implementation was critical in the success attained in many SLMP-1 target areas. Continuous sensitization of the woreda leadership and sectoral office heads to address the frequent changes in woreda authorities is needed. Regular experience-sharing events among woredas so that those woredas that fall behind can learn from the better performers are equally important.

SLM needs to be considered as an integral part of rural development, and therefore, a more holistic approach is needed to support livelihood development at the rural community level. Rural households face a variety of constraints to ensuring sustainable livelihoods and increased incomes. Constraints include inter alia lack of new ideas and knowledge on income generating activities, new technologies, and value addition, particularly to increase shelf life of products for better marketing options as well as limited access to production inputs and markets. Support is therefore required to overcome such constraints and effectively improve livelihoods and income levels.

6.6 Main barriers to sustainable forest management

From the preceding review the following key barriers remain:

1. Prior to the ongoing reform process, forestry had not been attributed the importance it merits in both policy and legislative reform, despite forestry's major contributions to rural livelihoods (cash and subsistence) and as a key component of strategies to address land degradation and combat climate change.
2. Insufficient information about, and appreciation of the contribution that forestry makes to rural livelihoods, employment and the national economy reduces the willingness to invest public funds in the sector.
3. The demand for wood fuel and fodder is likely to grow, but is still heavily dependent on natural forests, or 'unknown sources' (i.e. unsustainable extraction). There is a need to substantially boost the sustainable supplies of wood-fuel to respond to growing demand, to avoid degradation of forests.
4. The contribution of NTFPs and farm forestry to rural livelihoods is substantial, but access to markets is still challenging for many products, and business and technical skills and value chain development could be greatly improved. The sustainability of supply remains uncertain.
5. The establishment of representative and functional institutions at the local level to manage communal land and forest that can be sustained without long-term external support remains a challenge.
6. Many of the incentives for SLM and PFM have been artificially generated by externally driven and financed projects. Once such projects come to conclusion, there is still, as yet, insufficient guarantee that the benefits from sustainable forest management are a) sufficiently large and b) equitably shared to ensure adherence of all stakeholders to the new rules and management regimes.



7. Capacity to implement sustainable land and forest management which is a highly complex challenge. Institutions at the national, regional, and local levels of government all need the technical capacity and governance skills to support long-term sustainable forest management at the community level.
8. The complex nexus of 'rural development' and 'sustainable land management' often makes use of forestry interventions (agroforestry, forest restoration, water catchment protection). However, it is not always clear who has the institutional responsibility to implement such interventions. Forestry is becoming more and more mainstreamed into rural development and SLM programs, but still requires forestry expertise to optimize interventions and achieve desired impacts.

6.7 Opportunities to integrate sustainable forest management into the rural economy and scale up interventions

Increasing productivity of agricultural land reduces the amount of land required to produce the same agricultural commodity to meet a specific demand. As such, efforts to sustainably intensify agriculture are a key component of a strategy to reduce the deforestation and forest degradation driven by the expansion of extensive agriculture and livestock production. This evidently requires cross-sectoral communication and coordination to ensure that interventions in the forest and agricultural sectors are aligned, but does not mean that the NFSDP should itself address all aspects of agricultural intensification. Some interventions such as agro-forestry require collaboration between agricultural and forestry sectors, and a clear definition of roles.

Following from the analysis of barriers and gaps, we see the following key opportunities for the forest sector:

Integrating forestry into the rural economy: To ensure the mainstreaming of forestry studies, such as MEFC (2016) that highlight the economic importance of the forest sector can help to raise its profile in the eyes of other key Ministries, such as the Ministry of Finance and Economic Development and the Ministry of Agriculture. Such analysis of the economic contributions of the forest sector to the economy, to employment, to the livelihoods of rural communities, and to mitigate climate vulnerability can raise the awareness of key decision-makers about such values. This should help to put SLM and sustainable forest management more firmly at the heart of integrated approaches to rural development, thereby securing more political support and financial investment.

Ethiopia's commitment to SLM and Forest Landscape Restoration (FLR): The existing commitments to scale up SLM (via SLMP) and FLR (via the Bonn Challenge) through landscape approaches represent an unprecedented opportunity to mobilize political support and financial investment to achieve wide-scale improvements in forest protection and management.

Promote integrated land use planning and implementation at the landscape scale: Land use planning for entire landscapes and watersheds, with corresponding harmonized investments in implementation will help strengthen the recognition, protection and management of important forest resources, and reduce unintended consequences of agricultural developments at the expense of forests.



Ensure an enabling environment for forestry: Assess the policy environment and enabling circumstances of the evolution of community forest management, and forestry as an integral part of rural development.

Secure forest tenure: Major investments so far have focused on land tenure reforms and registration of agricultural land. Secure tenure on forests and forest resources for the appropriate forest users and managers as a key step to underpinning sustainable forest management. Work to clarify communal tenure, collective and individual rights and responsibilities within clearly demarcated and documented forest areas, where possible building on effective customary rules and practices governing forest resources. Options for securing tenure must be carefully designed and assessed, with room for flexibility to adapt to local circumstances.

Mainstream the mapping and registration of communal and forested land into the ongoing Land Registration processes, maximizing the opportunity to make use of rapidly evolving mapping technology and reforms in land administration. Current models of land registration may not be appropriate, but some of the technologies for documenting land parcels, tenure arrangements and land administration systems could be easily adapted to the specific requirements of the forest sector.

Complete the legal framework for Participatory Forest Management: Encourage and support all Regional States to prepare and adopt Proclamations that support the registration and sustainable management of forest lands, with clear institutional arrangements for their management. Ensure that clear guidance on the process to register and manage forests, including via PFM agreements, is disseminated to all stakeholders.

Improve markets for forest products and ecosystem services: Connecting efficient forest management enterprises with a reliable and rewarding market for forest produce, and markets for affordable inputs and services, combined with long-term sustainable financing that can assure a flow of revenues for ecosystem services, will help to increase the viability of sustainable forest management for forest owners (whether individuals, or communities). Clarification of rights to share benefits from all aspects of forest goods and services (including e.g. carbon stocks and watershed functions) is a key step to creating and sharing incentives with local stakeholders. Encourage investment in tree farming, where necessary addressing the underlying barriers (access to credit, inputs, services) to support farmers contribution to the sustainable supply of forest products.

Clarify and strengthen the institutional framework for forest management: Effective integration of forestry into an integrated rural development approach requires effective participation of the different stakeholders. Sustainable institutional solutions to support forest management require careful consideration of the complex social environment. There is a delicate balance to find between traditional customary tenure and institutions and modern alternatives.



Invest in institutional and individual capacity building: Support the successful integration of sustainable forest management into the rural economy through long-term investment to build the technical capacity and governance skills of institutions at the national, regional, and local levels of government. These all need the capacity to support long-term sustainable and profitable forest management at the community level. Integrate such efforts within a coherent framework of broader rural development strategies.

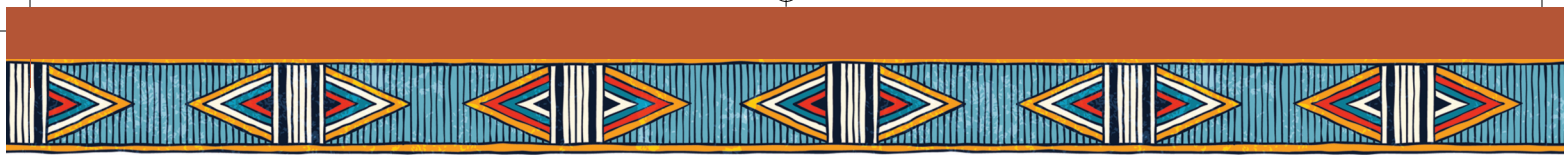
7 Urban Greening and Urban Forests

Sustainable urban forest planning and management contributes to a pleasant and healthy environment. As a valuable natural resource, urban forest may provide a number of direct and indirect benefits, including climate regulation, noise reduction, watershed protection, recreational opportunities, outdoor education, wood and fruit production and habitat resource for wildlife (Fetene and Worku 2013).

Improving the standard of urban green infrastructure in Ethiopian cities is a national priority. Economic development will continue to bring with it urbanization, greater population density in urban settlements, and correspondingly, increased demand for green infrastructure. To maximize the need of urban society, the Ministry of Urban Development and Housing (MoUDH) prepared the Climate Change-Resilient Urban Green Development Strategy as a road map to fulfill the urban population need in the area of urban green infrastructure service provisions. The MoUDH in collaboration with *Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)* has developed the Ethiopia National Urban Green Infrastructure standard which aims at setting the basic minimum standard requirements for Urban Green Infrastructure (UGI) development and management. The UGI standard was developed based on the experiences of international and national cities in UGI development and management. The standard has been evaluated by and commented on by the Urban Plan, Sanitation and Beautification technical committee. Therefore, this urban green infrastructure standard provides the basic minimum requirements to be achieved in the design, implementation and operation of urban green infrastructure.

Addis Ababa city is endowed with diverse woody plant species found scattered across different land uses including major streets, public parks, household premises and church-yards. The plant species across the different land uses are comprised of both exotic and indigenous tree species with a higher proportion of exotic ones.

Five land cover types were identified in the upper catchment forest area of Addis Ababa: *Eucalyptus–Juniperus* dominated forest, mixed native forest, single species *Eucalyptus* plantation, built-up areas, crop and grazing lands (Fetene and Worku, 2013). The different forested landscapes of the city support various species of mammals, birds and insects. Entoto Natural Park and escarpment, which lies in the northern part of the city, is among the Important Bird Areas of Ethiopia (EWNHS, 2012). There are about 200 species of birds and 115 species have been recorded in the park, two of which are Ethiopian endemics. The park is an excellent place for watching vultures, as well as eagles, buzzards and hawks, larks and ravens. It is also home to a few mammal species including Grey Duiker, Civet Cat, Spotted Hyena, White-tailed Mongoose, several types of rodents and monkeys. Gullele Botanic Garden, a pioneer botanic garden in Ethiopia, also hosts a number of bird species that include: Hammer kop, Sacred ibis, Black kite, Hooded vulture, Mountain buzzard, Common kestrel, Moorland Francolin, Speckled pigeon, Laughing dove, Alpine swift, Banded barbet, Abyssinian woodpecker, Ethiopian swallow, Mountain wagtail, Abyssinian oriole, Bronze manikin and Streaky seedeater. The different conservation areas such as public parks, botanic gardens and plantation forests support diverse species of insects. Research reports show that there are 18 families of insects in Ankorch



forest, 25 in Sheger park (Girma Negussie 2009) and 64 in Gulelle botanic garden (Fasil Adugna, 2010). These all significantly contributed to the provision of ecosystem goods and services including fuelwood, construction wood, water supply and recreation.

However, urban forests in the country were not given the required attention during the last decades. As a result, the city's urban forest has significantly deteriorated due to the high rate of deforestation, largely attributed to increasing population growth combined with rapid urbanization. Cognizant of this, various conservation efforts have been made recently to safeguard this biodiversity. These include the establishment of Addis Ababa City Environmental Protection Authority, Gulele Botanical Garden, Ethiopian Heritage Trust and public parks in the city. Establishment of Shashemne and Jima Botanical Gardens by the Ethiopian Biodiversity Institute are also contributing in forest biodiversity conservation and public awareness raising at large. Apart from this, the newly developed strategic spatial plan of the city duly considers possible urban green infrastructure with forest, river buffer vegetation, recreational parks and urban agriculture as the major components.

The following factors remain challenging to urban greening and biodiversity conservation in urban centers including Addis Ababa City:

- Unsustainable harvesting of wood (construction and fuelwood),
- Lack of implementation of a structural plan of the city or territorial approach to climate change (MEFCC) that promotes green networks, and
- Lack of harmonization between infrastructure development and conservation policies.

Several opportunities exist that contribute to sustainable management of biodiversity in urban centers including Addis Ababa city. These include:

- Institutional arrangements (the establishment of AA EPA, GBG);
- Environment-related strategies such as CRGE, REDD+; and
- The development of new structural plans for the cities, including green infrastructure.

8 Forest Sector Institutional Development

8.1 Review of forest-related policies, legislation, and regulations

In 1991, Ethiopia adopted a federal system of administration with nine regional states and two city administration councils. The federal system devolves significant power to regional states and city administrations. The latter have the power to raise revenues, plan and implement their own development activities – including natural resources management – within the framework of the policies and proclamations issued by the federal government.

The state owns all natural forests, woodlands and industrial plantations. Regional States are responsible for managing and administering these forests. Large areas of smallholder or community plantation woodlots also exist in the country, and these are owned privately. An important recent development in forest property ownership is forests managed through Participatory Forest Management (PFM). In PFM, the government and local communities co-manage forests. Legally, the ownership of PFM forests remains with the State, as this is constitutionally vested on the State. The implicit understanding, however, is that communities also co-own and co-manage PFM forests together with the government.

The Government of Ethiopia has increased its focus on sustainable environmental management and development over the past decades. This is reflected with the incorporation of several environmental and development issues in the Constitution, as well as the adoption of various strategies, policies and proclamations related to sustainable development. Table 19 provides a summary of the most important laws and policies related to sustainable natural resources management.

Table 19: Overview of policies, guidelines, proclamations related to the forest sector in Ethiopia

Policy	Main elements relevant to the NFSDP
Ethiopian Constitution (1995)	• Vests the right to ownership of land and other natural resources, including forests, in the hands of State and people (Article 40); Government administers land on behalf of the people. • Land may not be subject to sale or other means of exchange, therefore prohibiting any form of private or communal ownership. • Guarantees the right of Ethiopian ‘peasants’ and ‘pastoralists’ to free allotment of land and not to be evicted therefrom. • Private investors have the right to use land in accordance with “payment arrangements established by law”.
Forest Policy (2007)	• The first Forest Policy in Ethiopia’s history. • The objective of the forest policy is to increase the forestry sector’s contribution to economic growth by protecting and developing the forest resource and fulfilling the rising demand of forestry products and services. • Clear strategies are indicated to enable government, individuals and associations to carry out forestry resource development and protection activities to achieve the objectives set in the Forest Policy. • Indicates the policy incentives required to encourage investors, social and individual organizations to be engaged in forest resource development.



Policy	Main elements relevant to the NFSDP
Forest Conservation and Utilization Proclamation (2007)	• Aims to increase the contribution of forest resources to the national economy via sustainable management and utilization of forest resources. • Promotes markets for forest development including private forest development. • Recognizes State forest and private forest. • Designation of all “major forestlands” as State forests; process should involve consulting respective communities and their priorities. • Gives priority to community if designation and demarcation of state forest results in eviction of the local community. • Emphasizes the participation of local communities in the management of, and sharing of benefits from, State forests. • Forest rights may be granted to communities, associations or investors and are similar in substance to general land use rights. Forest Management Plans must be prepared. • The required regulation and guidelines are still in the draft stage and not yet approved in order to implement the forestry policy and proclamation.
Federal Rural Land Administration and Land Use Proclamation (2005)	• Ensures state and public ownership of land while establishing a framework for participation by peasants and pastoralists on managing rural land. • Mandates regions to establish land administration and land use proclamations appropriate to respective regional states. • Entitles peasants and pastoralists whose livelihoods depend on farming with rural land free of charge. • Provides private investors the rights to use rural land in accordance with the investment policies and laws at the federal and regional levels. • Provides framework for transferring land rights to individual users, communities, and private investors through the issuance of land holding certificates, concessions, or other agreements. • Provides the rights of transfer, lease or compensation for land and properties developed on it.
Federal Investment Proclamation (2012)	• Provides overarching framework for regional investment proclamations on allocation of land for investment. • Provides private investors the right to use land for “agricultural development activities” in accordance with federal and regional laws. • Applications are vetted for technical and financial feasibility and environmental and social acceptability. • Aims to promote foreign and domestic investment in various sectors including investment on land, to accelerate economic development. • Defines the types of investment that investors should and should not be engaged in; mandates the Council of Ministers to make a detailed list of investments acceptable for domestic and foreign investors.
Environmental Impact Assessment Proclamation (2002)	• Recognizes the importance of environmental impact assessments prior to land investments or developments. • Prohibits any investment that requires environmental impact assessment without authorization from the federal and regional environmental agency. • Environmental Impact Assessment (EIA) reports are expected to portray the positive and negative impacts of the projects both for society and the environment. • Further, the country’s constitution complements the EIA proclamation to broaden the scope of environmental and social sustainability requirements of related programs.
Energy Proclamation (2013)	• Aims to incentivize private sector investment in renewable energy. • Will be complemented by the feed-in-tariff bill, which will offer independent power producers the option to sell renewable power producers to the national grid at specific rates. • Makes provision for loans and financial support.



Policy	Main elements relevant to the NFSDP
Environmental Policy (1997)	- Provides institutional, implementation and legislative framework, responsibilities and mandates for sustainable development of natural resources. - Emphasizes the need to establish legal reference for people's participation in natural resources management. - Provides overarching framework for monitoring and evaluation of environmental projects.
Agricultural Development-led Industrialization (ADLI) Strategy (1993)	- Broad and long-term development strategy with two broad goals: poverty reduction and rapid economic growth. - Aims to strengthen the linkages between agriculture and industry by increasing the productivity of small scale farmers, expanding large-scale private commercial farms, and by reconstructing the manufacturing sector so as to valorize national human and natural resources.
Plan for Accelerated and Sustainable Development to End Poverty (PASDEP) (2006-2011)	- Second generation ADLI; main focus on improved crop and livestock productivity and sustainable natural resources management. - Elements of the PASDEP in the agricultural sector include capacity building through training, development and adoption of high yielding technology through strengthened agricultural research and extension service delivery. - Includes agricultural research and extension policy, which aims to develop and select agricultural technologies to bring about increased productivity, which will in turn improve food security. - The agricultural extension component included training and posting of 45,000 development agents in Kebeles nationally, establishment of farmers' training centers and strengthening the research-extension-farmer linkage.
Development, conservation and utilization of wildlife (Proclamation No. 541/2007)	- Guides the development, conservation and utilization of wildlife resources. - Governs establishment and management of national parks.
Access to Genetic Resources and Community Knowledge, and Community Rights (Proclamation No. 482/2006)	- Governs legal access to Genetic Resources of the country. - Protects community knowledge and rights.
Ethiopian Water Resources Management Proclamation No. 197/2000	- Delimits the boundaries of important water bodies. - Prohibits clearing and cutting trees or vegetation and the construction of residential houses within the delimited banks of water bodies.
Guideline for Participatory Forest Management in Ethiopia (2012)	- The purpose of the guideline is to consolidate the different approaches of PFM being introduced in the country and provide a more refined and simplified approach that could easily be adopted and support PFM upscaling. - Targets forestry extension workers who facilitate the PFM planning process in their locality and for woreda and zonal forestry professionals to facilitate the establishment and implementation of PFM.

As is evident from Table 19, the existing federal legal and policy framework for the forest sector is comprehensive and well-designed. At the same time, a large proportion of these laws and policies suffer from inadequate implementation and enforcement (Bekele 2008). Indeed, limited law enforcement is considered one of the most significant challenges to sustainable forest management (Magrath & Grandalski 2001). Several factors can be identified as hindering the effective implementation of existing laws and policies:



- Policies and proclamations (high-level laws) at the federal level provide an overarching framework for achieving environmental and development outcomes. These are meant to be complemented by specific regulations and implementation frameworks which are the basis for concrete action plans. In most cases, however, policies and proclamations are not supported by regulations and implementation frameworks. Even when regulations are in place, they frequently do not provide for follow up monitoring and evaluation mechanisms.
- Legal frameworks often emphasize prohibitions and law enforcement. In many cases, legislation effectively criminalizes community practices with negative consequence on the resource base. Efforts to incorporate the participation of citizens in natural resources management have sought to address this, but results have been mixed, and participation is often loosely defined. Participation within the context of natural resources management is generally understood to mean mobilizing farmers to implement something rather than only involving them in decision-making (Harrison 2002). Introducing more comprehensive frameworks that nest prevention, detection and monitoring within a broader strategy of natural resources management while engaging communities in a constructive manner may help to encourage community participation towards implementation. This could include, for example, public education and awareness raising on relevant laws and engaging communities in monitoring and enforcement.
- Implementation is hindered by a lack of capacities in relevant government institutions. Actors at various levels of governance are operating under significant institutional and fiscal constraints (Snyder et al., 2014). Owing to the decentralized governance structure and resultant lack of human capacity in some regions, inconsistencies between regions and federal institutions exist. In general, policy narratives may provide a positive outlook but these are often not accompanied by sufficient allocation of resources to realize policy objectives.
- Policies and laws relevant to land use are not coherent. Several sectoral policies and proclamations relevant to land use overlap, resulting in a lack of clarity in mandates for implementing institutions. For instance, there is an overlap between the Forest Proclamation and Land Administration Proclamation, both of which deal with natural resources management, including forest. On the other hand, the Forest Proclamation does not provide a legal provision for common property ownership, which undermines community authority over forests. If PFM is to be considered a viable strategy option for sustainable forest management, it needs full legal support for community ownership of forest resources.
- Related to environmental and social safeguards, the absence of established principles, standards and indicators presents a barrier to assessing and managing risks. This leaves the existing environmental impact assessment process open to subjective interpretations of individual projects by sectoral ministries.

- Many policies, laws and strategy documents regarding natural resource management are produced based on outdated or rough estimate data. The lack of up-to-date and reliable data is a major constraint in the policy making process, which can lead to setting unrealistic targets. Thus, there is a need to improve the quality of data upon which national policies and proclamations can be based and to further coordinate the flow of information at multiple levels of government to develop a reliable information and data management system.

Table 20: Policy based strategies and associated incentives to promote private sector engagement in forest sector development, and respective implementation status

Strategies indicated by the forest policy	Status of implementation	Issues that need more attention
Policy statement: Development of forests intended as a source of fuelwood, material for construction, industry, environmental conservation and other purposes will be undertaken through individuals, associations and organizations.		
Government will provide land free of lease payment, as appropriate and according to existing regional land administration and utilization laws. Lands will be designated for forest development, for afforestation purposes and production of various forest products by individuals, organizations and associations.	- No land in the stock identified for forestry investment. - MEFCC indicated that preparations are underway to identify and delineate land for forest development of different purposes, including land for commercial plantations. - The Government is undertaking efforts to identify and allocate land resources through satellite analysis with support from WRI, but ground truthing is lacking.	- Strengthen existing CRGE coordination mechanisms (e.g. interministerial steering committee, management committee). - Identify land suitable for commercial tree plantations. - Sub-article 2(d) of Article 52 of the Constitution entrusted the power to administer land and natural resources to the regional states in accordance with laws enacted by the federal government. This implies that regional states have huge responsibility in identifying and designating suitable land for commercial forest plantation development with guidance from MEFCC.
Provide conducive environment to ensure that investors are exempted from annual income tax and any form of tax levied on the land until such time that the forest attains its maturity stage.	- According to the investment guide to Ethiopia (2015), investment projects in forestry development are exempted from income tax for up to 9 years, depending on the location. - Additional 2 years for projects that export at least 60% of its products/services. - Wood-based industries are exempted from income tax for up to 6 years, depending on project location and type. 100% of custom duty and tax exemption for imports of capital goods to implement their projects. - Spare parts up to 15% of the total value of the imported ex-empted capital goods are also exempted. - For foreign investors, capital remittance rights out of Ethiopia in convertible foreign currency is also granted.	- Tax incentives are not enough for forest investments, which are long-term in nature. - Performance-based support grants from government and donors are required to minimize risks and motivate early movers in the sector. - Access to climate finance both in the form of grants for capacity building and loans for investments.



Strategies indicated by the forest policy	Status of implementation	Issues that need more attention
Provision of professional and technical support.	• Technical support is limited to smallholder farmers by supplying them with planting materials and seeds. This is because the existing forest development initiatives are mainly driven by smallholder farmers. • The provision of Eucalyptus seedlings is discouraged from government nurseries but farmers are preparing their own seedlings. • Marketing and value chain support is missing to link farmers to the limited existing wood-based industries in an organized manner to reduce the production costs of supplying the raw materials. • The existing industries are short of raw materials despite the abundance of trees on non-forest land planted by smallholders.	• Urgent need to aggregate the supply from smallholder farmers and link them to the value chain. • Supply improved planting materials (e.g. clonal nurseries). • Eucalyptus planting by smallholders is growing but not guided by technical support. • Technical manuals and training on basic technical tending operations to smallholder farmers on woodlot establishment. • Support preparation of management plans. • Supporting existing interested industries to establish core plantation stock and work with smallholders as outgrowers.
Designate productive forest areas within state forests to be afforested through concessions given to private individuals, organizations, and associations.	• State forests in Oromia and Amhara regions are allocated to public enterprises based on concessions. • Not clear whether these enterprises can sublease their concessions. • No land designated for private investment.	• Promote and facilitate joint ventures between public enterprises and private companies to develop open areas within concessions. • Establish plantations in forest buffer zones as part of the REDD+ initiative. • Transform the existing poorly stocked public plantations to intensively manage plantations with and without joint ventures with the private sector.
Provision of seeds and seedlings at fair (subsidized) prices.	• Available for smallholder farmers mainly from government nurseries and environmental NGOs.	• Improve the quality of planting materials.
Facilitate access to credit.	• Access to affordable credit at 8.5% interest is available by the Ethiopian Development Bank for plantations only when combined with wood industry investments. • Commercial Bank loans with an interest of 16% and more and short lending periods are not suitable for forest investments. • Relatively open for wood-based industries. • Not yet for commercial plantations.	• Special private sector window should be created for investment in the forestry sector. • Access to climate finance through CRGE and GCF.
Identifying investment lands and options based on study and research.	Not yet	MEFCC should lead and coordinate the process.
Facilitate tax reduction schemes. For farmers/pastoralists, designate part of their land for agroforestry.	Not yet	Guideline to implement this provision should be prepared and implemented.

Strategies indicated by the forest policy	Status of implementation	Issues that need more attention
Policy statement: The ownership guarantee of any private individual, association and organization will be respected for forest development within the area under ownership or within a concession area in state forests.		
Grant certificates guaranteeing ownership.	• Green certificates for smallholder farmers include tree crops. • Certification possible for communal lands.	• More clarity is needed on carbon rights, particularly about ownership of the carbon and transfer rights.
Ensure the implementation of the right to use and transfer lands.	• Covered in the rural land administration and utilization laws.	• More clarity is needed on carbon rights, particularly about ownership of the carbon and transfer rights.
Monitor and follow up according to adopted management plans.	• Preparation of management plans underway by public enterprises, but not for the woodlots and rehabilitated landscapes.	• Preparation and adoption of management plans based on clearly agreed management objectives.

8.2 Current forest sector institutional set up at federal and regional level

Ethiopia has taken bold steps to reduce the impact of climate change and natural resource degradation through the formulation of CRGE strategy, sound environmental legislation and other incentive-oriented initiatives. However, the full effect of such measures can only be realized with the presence of viable institutions and the involvement of local communities. This requires sustained capacity-building initiatives at federal, regional, zonal, district and local levels.

The forestry sector suffers from frequent institutional restructuring that has resulted in limited capacity to engage in sustainable forest resource management and a poor forest information management system. The sector had not only financial and material constraints but also lost its technical capacity. High staff turnover has led to the loss of skill and accumulated knowledge over time, resulting in weak institutional memory and information management.

The ME FCC was established with the mandate to develop and implement programs in environmental management and forestry. Prior to this, forestry was dealt with through a small bureau in the Natural Resources development Division of the former Ministry of Agriculture. The creation of ME FCC demonstrates the growing importance placed on forests and natural resources in Ethiopia's economic development.

The current institutional set up at the regional level varies from region to region. Given the different socio-economic contexts and forest resource potentials, it is not expected that there should be a similar institutional set up in all regions. However, there is an urgent need to establish and/or designate dedicated institutions dealing with forestry at the regional levels with cascaded structures reaching the grassroots level. The institutional set up to be organized at regional level should be aligned with ME FCC. In this regard, there is a need to accommodate existing initiatives. In regional states with public forest enterprises, mechanisms should be put in place to maintain them while aligning them to the sector's overall institutional set-up.



It is interesting to note here the experiences in Germany, where there is a federal institutional set up similar to that of Ethiopia. Germany's Ministry of Environment and Forestry (BMUB) is responsible for setting national policies and strategies at the federal level. However, regions (*Bundesländer* in German) have the mandate to set up the appropriate regional institutions for the proper management and use of forest resources. This allows states to establish the institutions that reflect different regional contexts. For example, where appropriate, regional states have set up forest enterprises while others have environmental protection agencies. The names of these protection agencies differ however, according to the region. This also means that if there are institutional changes at the federal level, for example due to elections or changes of political parties in power, the institutions at the regional level are less affected and are able to continue their mandate in the forest sector in a robust fashion.

8.3 Stakeholder analysis

The term stakeholder refers to individuals, groups and institutions that are interested, have a legal mandate, or are active players in a particular resource, in this case, forest resources. This section assesses the existing national institutions, processes, and frameworks in various sectors, which are responsible for implementation of the national laws and policies relevant to the forest sector and land use in general. The focus of this analysis is to identify and describe national-level stakeholders on the basis of their institutional mandate relevant to the forestry sector and depict the interface amongst them. It provides analysis of the roles and mandates of existing institutions and identifies gaps and critical aspects. This analysis provides the basis upon which to propose an institutional and functional structure relevant for effective implementation of the NFSDP. More detailed stakeholder analyses will be required when developing Regional Forest Sector Development Programs.

At the national level, the main government institution responsible for forestry and environment is the Ministry of Environment, Forest and Climate Change (MEFCC). Moreover, there are other institutions responsible for issues related to forestry such as land use, rural development, water and energy, wood-based industries, trade, research and education. Table 21 provides a summary of federal institutions and their mandates relevant for the NFSDP process.

Under the decentralized federal structure, each federal line ministry has hierarchies linked to respective regional bureaus. The Constitution of Ethiopia places responsibility for the administration of land and natural resources on regional governments and bureaus. Regional bureaus or similar institutions reflecting the new institutional structure for forests and environment (i.e. MEFCC) are planned, but have yet to be established. While MEFCC is developing and strengthening its structures at the lower levels, it is important to work with existing government structures relevant to the forestry sector at regional levels in the meantime. In general, federal line ministries are responsible for translating broader policy targets and objectives into their respective sectoral action plans. This includes the translation of cross-sectoral proclamations into action plans and the coordination of the respective regional state institutions for the implementation of action plans through financial disbursement and technical backup. Regional bureaus are often responsible for adapting respective national plans to fit into the regional context and coordinate zonal and Woreda offices for the implementation of plans.

Table 21: List of national level stakeholders with their institutional mandates relevant to the NFSDP action areas

Institution	Relevance to the forestry sector
The CRGE Platform	
Ministry of Finance and Economic Co-operation (MoFEC)	• Approves all development programs including the NFSDP.
	• Hosts the CRGE coordination unit representing the CRGE unit of each sector.
Forest Production Value Chain Programmatic Action Area (MEFCC led stakeholder platform)	
Ministry of Environment, Forest and Climate Change (MEFCC)	• Hosts the Secretariat for the CRGE.
	• Hosts the Secretariat for the National REDD+ initiative.
	• Develops and follows up on implementation of the NFSDP.
	• Develops and revises forest sector policies, strategies, proclamations, regulations and guidelines.
	• Promotes and distributes improved stove technologies.
Ministry of Industry (Mol)	• Represents the country in forest related international fora.
	• Promotes and supports wood-based industry development.
Federal Micro and Small Enterprises Development Agency (FeMSEDA)	• Leads and supports the development of small and medium scale enterprises.
Ministry of Construction (MoC)	• Promotes the use of sustainably produced timber products in the construction sector.
Ministry of Trade	• Facilitates the marketing and export of timber and NTFPs.
Customs and Revenue Authority	• Supports private sector investors in the forestry sector by implementing incentive packages provided by the government.
	• Monitors imports of timber and NTFPs.
Ethiopian Investment Commission (EIC)	• Provides licenses and support to forest sector domestic and foreign direct investors.
	• Develops and revises incentive packages for forestry sector investors.
Agricultural Investment Land Management Agency	• Identifies and prepares, in collaboration with regional states, 'ready to invest' land free of tenure conflicts for private investors.
Ethiopian Chamber of Commerce and Sectoral Association (ECCSA)	• Coordinates and establishes sectoral associations and regional chapters.
Forests and Rural Development Programmatic Action Area (SLMP National Steering Committee led stakeholder platform)	
SLMP National Steering Committee (NSC) (Chaired by the State Minister of the Natural Resources Division of the MoANR)	• Oversees implementation of sustainable land management activities where forests are one important element.
	• High level representation from MoANR, MoFEC, MoWIE, MEFCC, and BoAs of the SLMP regions.
	• Establishes policy guidelines and provides overall supervision for project implementation.
	• Approves annual federal and regional work plans and budget.
	• Reviews annual implementation performance reports.



Institution	Relevance to the forestry sector
Ministry of Agriculture and Natural Resources (MoANR)	• Implements sustainable land management programs. • Coordinates watershed based soil and water conservation activities and CRGE strategy on agriculture. • Implements water harvesting and small-scale irrigation. • Intensifies and transforms agricultural development systems and practices.
Ministry of Livestock and Fishery (MoLF)	• Promotes quality based livestock production. • Develops livestock feedstock production systems. • Promotes cut and carry feeding system.
Ethiopian Rural Energy Development and Promotion Center (EREDPC)	• Promotes efficient and environmentally sound energy technologies. • Facilitates energy development in rural areas.
MEFCC, Community Forestry and Agro-forestry Extension Directorate	• Supports community-based forest management in the rural landscapes. • Develops and provides agroforestry extension services.
Environmental Services Programmatic Action Area (REDD+ Steering Committee can lead the stakeholder platform)	
MEFCC, REDD+ Secretariat (Chaired by the State Minister of the Forest Sector Division of the MEFCC)	• Coordinates the implementation of the REDD+ initiative of the CRGE. • It has multi-stakeholder steering committee that comprises members from relevant ministries, regional level representatives, NGOs, academia and research institutions.
Ethiopian Wildlife Conservation Authority (EWCA)	• Undertakes conservation of wildlife and its habitats. • Implements sustainable utilization of wildlife resources.
Ministry of Water, Irrigation and Electricity (MoWIE) including EELPCO	• Increases access to electricity. • Supports watershed conservation activities with particular emphasis on the hydro-dam catchments. • Monitors sustainable use of water resources for irrigation and drinking purposes.
Ethiopian Biodiversity Institute (EBI)	• Leads and ensures the appropriate conservation, sustainable use, and access and benefit sharing of biodiversity.
Ministry of Transport (MoT)	• Plans and executes construction of road and railways in an environmentally-friendly manner. • Creates access to production forest sites.
Ministry of Mines, Petroleum and Natural Gas	• Implements biofuel development • Responsible to execute mining in environmentally friendly way.
Ministry of Urban development and Housing (MoUDH)	• Implements urban greening programs. • Promotes the use of sustainably produced timber products for housing development.
Ministry of Science and Technology (MoST)	• Coordinates the Ethiopian Man and Biosphere (MAB) Program and MAB Committee. • Oversees Biosphere Reserves and related initiatives.



Institutional Development Programmatic Action Area (EEFRI led stakeholder platform)	
Ethiopian Environment and Forest Research Institute (EEFRI)	• Supports the sector by adapting and generation technologies relevant to sector development. • Transfers technologies to end users. • Provides training and capacity building to the practitioners in the sector.
Universities	• Develop undergraduate and graduate programs that support sector development programs. • Conduct sector relevant research and technology transfer.
Ministry of Education (MoE)	• Integrates forest and environmental education into school curriculums. • Promotes green schools.
Crosscutting Roles	
National Regional States	• Administers land and natural resources including forests in accordance with laws enacted by the federal government. • Prepares and implements Regional Forest Sector Development Programs in alignment with the NFSDP.
Development partners (they can participate in the stakeholder platforms of their interest area)	• Support implementation of the NFSDP actions.
NGOs (they can participate in the stakeholder platforms of their interest area)	• Support implementation of the NFSDP actions.

8.4 The need for intersectoral coordination

Forests provide multiple goods and services to society. The rapid degradation and depletion of the forest resource base is already manifesting itself in the different sectors of the economy such as agriculture, water resources, energy and biodiversity. Population growth coupled with accelerated land degradation increases the demand for agricultural land. However, the expansion of cropland into the few remaining forests to increase agricultural production should not be considered a viable option. Intensification of agricultural development by employing efficient technologies and practices can compensate for horizontal expansion by improving productivity.

Moreover, the existing hydroelectric power plants and irrigation schemes are seriously affected by siltation, which is a direct consequence of watershed degradation. The resulting frequent power interruptions have had negative consequences for investment, industries and the economy as a whole. Deforestation is widely recognized as one of the most important factors aggravating the existing drought conditions, which have in turn increased the vulnerability of the population to food shortages.



On the other hand, forest development, processing, investment land management, licensing, import and export related issues as well as environmental and social safeguards, all fall under the mandate of different government institutions at federal and regional levels. This calls for strong cross-sectoral coordination to enhance the efficiency of support services provided to the private sector.

The threats to the sustainable managements of forests can be properly addressed to enhance the sustainable provision of multiple goods and services of forests, if and only if relevant sectors cooperate and collaborate in the preparation and implementation of the NFSDP. Moreover, the implementation of GTP II targets related to the forestry sector that are highlighted in Annex 3: require strong collaboration amongst the implementing institutions.

Currently, the CRGE inter-Ministerial steering Committee is the main intersectoral platform established to guide the implementation of the CRGE. It can serve as an entry point to guide the preparation and implementation of the NFSDP. Moreover, the parliament standing committee, cluster platforms of relevant ministries and sector platforms can be mobilized in the preparation and implementation of the NFSDP. But, due to the diversity of stakeholders (Table 21), cross sectoral policies and proclamations (Table 19) and cross sectoral GTP II targets (Annex 3:), there is a need to have more multi-stakeholder platforms following the main programmatic action program pillars of the NFSDP. It is important to build on existing multi-stakeholder platforms where possible, consolidating and/or giving them additional mandates related to the NFSDP. Accordingly, there is a need to create the following multi-stakeholder platforms and link them to the CRGE and ME FCC:

- Forest production value chain multi-stakeholder platform (to be established)
- Forest environmental services multi-stakeholder platform (REDD+ Steering Committee can serve this purpose, link to ME FCC national REDD+ secretariat)
- Forests and Rural Development multi-stakeholder platform (SLMP National Steering Committee can serve this purpose, link to the CRGE's approval of the NFSDP)
- Institutional Development multi-stakeholder platform (to be established, link to CRGE and ME FCC stakeholder coordination)

8.5 Human Resource capacity development

Human and institutional capacity development is crucial for forest sector development. Skilled human resource availability is important for the entire cycle of sustainable forest management, from the establishment and maintenance of forests and trees to proper harvesting, processing and marketing of products and services. The prerequisite to effective sector development, including attracting private sector involvement, is the existence of technically capable and efficient human resources. Today, the quality and quantity of skilled manpower in the forest sector is critically low in Ethiopia. Unless addressed immediately, this could be a major hindrance to materialize the desired development and industrialization of the sector.



Today, there is a clear gap in the tailored training required to produce forest technicians who can handle technical forest operations such as pruning, thinning, harvesting and others with modern tools and equipment. Currently, forest operations are mainly handled by daily laborers without formal training. This compromises the quality of the timber produced.

The GTP II has identified priority industry sectors and planned for their manpower requirement. These sectors include cotton and textiles, leather and leather products, metal and engineering, chemicals and construction material, meat and dairy, food and beverages industries. GTP II has planned for about 2.2 million high level and medium level trained manpower for these sectors (GTP II – MOI, 2016). This plan, however, overlooked the forest sector and forest industry development requirements. This calls for attention from all concerned to design an appropriate human capacity development strategy and procure funding for the sector's workforce development if forestry is meant to contribute to the country's overall economic and social development.

Without sufficient quality and quantity of skilled manpower, developing a globally competitive forest and wood processing industry is difficult. Therefore, substantial investment is needed in quality education. Employees need to be creative, dynamic, flexible and capable of working with modern and advanced technologies.

The higher education system in Ethiopia produces forest sector graduates (forest developers and workers in wood processing factories) at various levels from a certificate level to a PhD. There are a large number of Technical and Vocational Education and Training (TVET) centers and universities in the country that provide formal training in various fields of forestry. The TVET is designed to offer more practical oriented training at certificate level, while universities produce graduates that can work in a range of services from forest management, policy making and leadership. The TVET also produces most of the Development Agents that provide extension services in natural resource management (NRM) including forest development at grassroots level. TVET graduates are also the main owners of most of the small and micro-forest product enterprises, through the government's related support program.

Dedicated forest based training centers established in the country include Menagesh-suba, Boter-becho and Mertule Mariam. However, most are not functional anymore. These centers used to produce forest technicians as well as offer refreshment trainings on practical forestry operations. However, they also suffered from instability and lack of sustainability similar to many other forestry related institutions. Some of these centers such as Mertule Mariam have been developed into TVET training centers.

Despite the recent expansion of training centers at TVET and University levels there are many general problems in forestry human resources today. Some of these problems include:



- Overall low total number of forestry professionals in the country;
- Poor skill in applying modern technologies and techniques and overall poor quality of the available professionals; and
- Critical shortage of professionals outside the most classical areas such as in bio-technology, forest industry, in value added processing, forest product marketing, forest economics and management.

In general, there is a huge skilled human resource shortage in Ethiopia, and also a pronounced lack of tailored made training to fill this gap. This calls for immediate action by the government to invest in quality education in the sector. Some analysis of the TVET and University levels training of forestry professionals is presented in the following section.

8.5.1 Tailored technical and vocational training

The TVET level training is the main producer of the Development Agents workforce that provides NRM (including forestry) services at the Kebele level, as well as technical skills in forest-based industries such as furniture production. The TVET system is designed with the focus on building a culture of entrepreneurship and preparing youth for self-employment. In fact, most of the small/micro wood-based industries are graduates of TVET.

The TVET system in Ethiopia is rapidly expanding. The government believes that current low productivity is due largely to the human resources gap. Thus, the number of TVET established and student enrollment is growing.

The GTP II target for TVET is to increase the number of TVET Institutes from 1,329 in 2014-15 to 1,778 in 2019-20; and increase TVET enrollment from 238,584 in 2014-15 to 596,455 in 2019-20.

Table 22: TVET graduates and its trend

	2008-09	2009-10	2010-11	2011-12	2012-13
Number enrolled	308,501	353,420	371,347	314,159	238,884

A major challenge of today's TVET system is that their teachers or instructors largely lack the appropriate practical skills, making them unable to train their students with practical skills that meet basic occupational standards. This is the result of a training system that for a long time emphasized theoretical knowledge, which was often not aligned with the opportunities and challenges of the country.

8.5.2 Aligning formal education programs to sector development goals

Ethiopia's higher education system is massively expanding. In the last two and half decades, the number of public universities has grown from just two to over 40 today. Consequently, student enrollment and graduates increased massively. Close to half a million students are in Ethiopian universities today. Overall, the number of students receiving primary, secondary and tertiary education is estimated to reach over 25 million. Government expenditure in education has also increased tremendously over the past three decades. In 1990, 7.5% of government expenditure went to education while in 2009, 23.6% of government expenditure was dedicated to education.



Total enrollment in higher education institutions (both public and private) reached over 755,000 in June 2014. The average annual growth rate of enrollment at public higher education institutions amounted to 14% over four years from 2008-09 to 2012-13. In 2013-14, the proportion of the enrollment at public higher education institutions was 85.6%, the remainder enrolled in private institutions. Of the total higher education enrollment, 57% of students participate in regular undergraduate classes and 43% in a combination of distance, summer and extension courses (MOE, 2015).

Forestry education at the higher level began in the late 1950s, and since then has evolved from diploma level training to the PhD level. For many decades, the forestry education curriculum focused on general forestry and plantation silviculture, not offering students options to specialize. More specialized education began during the early 2000s. Today, over five different specializations are offered at Wondo Genet College of forestry and natural resources.

For a long time, the Wondo Genet College, established in 1978, was the only college with forestry training in Ethiopia. In total, close to 5,000 students (diploma, BSc and MSc) have graduated in forestry from Wondo Genet, and most of the professional foresters working today in the country are from this college, with the exception of a few more professional foresters graduated from Haramaya University during the 1980s.

Wood engineering and wood industry related teaching and research usually take place in engineering faculties or universities such as Adama University and Bahir Dar Polytechnic Institute. The wood engineering and industry aspects are treated as a distinct field from the teaching in resource base development, and therefore the two have never been well integrated.

Since 1978, Wondo Genet College of Forestry has offered diploma-level training. Since 2004, it has upgraded its education system to BSc, MSc and recently PhD as well. Three other universities also provide forestry education at a BSc level and above today, namely:

- Debre markos University; Burie College of Forestry (BSc; MSc)
- Wollo University (BSc)
- Haramaya University; Haramaya College of Forestry (MSc)

In addition, over 15 other public universities offer education in related fields such as NRM, watershed management, soil science, wildlife conservation, wood engineering and the like. Despite this increase in university establishment and the expansion of curricula, the quality of education is said to have dropped significantly. Graduates are not prepared for what the field and industry expects.



A number of factors contributed to the decline in quality of education and graduates. These include:

- **Quality of teaching staff:** The teaching staff lacks practical experience themselves and therefore are not qualified enough with practical skill to provide the quality training that forest industries require. Nearly all university-level teachers are recruited from fresh graduates with no field or industry experience. These recruits quickly complete their MSc and PhD and become the major teaching staff in the universities. Because they themselves have more theoretical knowledge, they tend to focus more on theory in their teaching. Moreover, the low salary and constraining work environment in the higher education system further contributes to the exodus of experienced and mature staff. Thus, universities struggle to cover regular teaching-learning processes by recruiting young and inexperienced professors.
- **Insufficiency of number of teaching staff:** While student enrollment has grown tremendously in all fields and at all levels (BSc, MSc and PhD), including in forestry, teaching staff has not kept pace with this growth. The student-to-teacher ratio has grown fast, meaning each teacher struggles to supervise large numbers of students each year. Overloads are a frequently mentioned problem, giving university teaching staff limited time for innovation and research.
- **Placements don't respect student interests and field specific contexts:** There are a number of placement-related constraints. First, the higher education placement system does not consider field-specific contexts such as the need to balance number with intensive practice-oriented education. Placement is usually top-down, and most students end up studying fields that are not their areas of interest. Forestry is perhaps the least favored field of study among students. Consequently, most students that join forestry faculties pursue their education with low motivation rather than with passion. Further, limited or unattractive employment opportunities in the sector over the past 20 years have made interest in forestry education drop considerably. The lack of skilled and motivated young professionals explains the poor development of the forest sector and the lack of business development and expansion.
- **Quality of students enrolled:** The selective placement of highly qualified students to non-NRM fields means the NRM fields including forestry usually receive low quality and less motivated students. To increase university enrollment, the pass mark has been lowered compared to the previous education system, which allows marginal students to qualify for university level education. However, higher grade students are placed in fields such as medicine, engineering and others, while NRM students are most often of marginal capacity.
- **Insufficiency of teaching facilities:** The facilities required to cater to the growing number of students is lacking. Most universities are of a recent establishment and these may not even have the basic equipment for practical training, such as laboratories, laboratory equipment, field practical equipment or tools. For example, the main forestry college Wondo Genet does not have the equipment and lab facilities required to ensure Ethiopia's forestry education and research is aligned with international standards.



8.6 Technological capacity development

Ethiopia's forest sector is characterized by the use and application of the most classical technologies and practices. Most of the forest based industries of the country are old and obsolete, and recent establishments (e.g. panel factories) use predominantly used machines imported from China or Europe. Their efficiency is, therefore, very low and their value added to production remains limited. This reduces Ethiopia's international competitiveness significantly. For instance, more than 50% of OFWE's sawmills in operation are from the time of the Derg or earlier. Many of the sector's large industries such as the Ethiopian Chipwood and Furniture Company (ECAFCO), Ethiopian plywood factories (now privatized), Wenji paper factory are all very old. Some of the wood panel factories recently established by private entities also use secondhand machines.

At the resource development level, nurseries apply basic traditional potted or bare rooted seedling production systems using seeds collected mostly from local seed sources with little quality control. Pruning and thinning is rarely applied and when applied, is usually done using simple tools such as axes using human labor. Only in rare cases is harvesting done with chainsaws, as axes or crosscut saws are more widespread.

The lack of technology is visible in a number of ways. For instance, the country's vast eucalyptus resources are not being used for industrial purposes. The use of this resource is limited to poles, posts (scaffolding) and firewood. Only very recently, a few factories started producing eucalypt panels. The same is true with bamboo. Vast *Prosopis juliflora* stand remain unutilized in Afar due to poor technological capacity development. Further, most of the NTFPs produced in Ethiopia are exported raw without value added processing, such as coffee.

About four regional seed centers were recently established in the country in four regional states. However, these were equipped with the basic seed storage facilities without state of the art technology. The centers are also operating at sub-standard level. The technologies applied in these seed centers require updating and this should be supported with research to develop locally adapted appropriate varieties.

Despite the frequent restructuring of these centers, they have remained important innovation centers for the forest sector in Ethiopia. Most importantly, the two centers have screened several exotic species for forest development in Ethiopia, including for their wood quality. Today, these centers have been upgraded to the Ethiopian Forest and Environment Research Institute. The institute has 88 working staff (BSc, MSc and PhD) with 16 MSc and PhD level staff on study leave. The institute has eight research focus areas:

- Plantation and Agroforestry;
- Forest Resources Utilization;
- Natural Ecosystem Management;



- Forest Protection;
- Climate Science;
- Environmental Pollution Management;
- Socio-economic, Policy, Extension and Gender, and
- Environment Laboratory.

Despite the institute's recent upgrade, the capacity of the forestry research system in Ethiopia, human and financial capacities, is not to the level where it needs to be in order to generate appropriate technologies that contribute to sector development and industrialization. Most research activities are conventional resource assessment types, and there is no application of modern laboratories and technologies such as cloning, genetic improvement and the like. This is partially explained by the research centers being poorly equipped with the facilities and budget required for innovation. This needs to be changed and the research system in the country strengthened, as without technological capacity development, increasing the competitiveness of the forest industry will not be possible. Research-driven innovation, combined with investment in research and education are therefore required to make the forest sector grow and contribute to national development.

The poor link between research and extension combined with the lack of coordination among institutions that operate in research and extension are also part of the challenge. As a result, the research agenda is of lesser relevance for the extension system.

Technological advancement is the prerequisite for attracting and retaining investment in the forestry and wood manufacturing sectors. Technological advancement is what makes the sector competitive, fostering export and access to new markets, allowing the forest sector to play its part in rural development and overall national economic growth. Some of the priority technologies that are needed to improve the performance of the forest sector of Ethiopia may include but are not limited to:

- Clonal nursery technology and high value seed propagation and certification,
- Development of a bio-economy based on modern timber product processing and manufacturing,
- Inclusive business innovations for sustainable forest management and commercial plantation forestry engaging communities and large scale industries,
- Ecosystem services and sustainable use of biodiversity,
- Environmental and social safeguards for sustainable economic development.

For each key technology, research and development programs should be supported based on competitive tender and together with international partners.



Ethiopia has a relatively long history of forestry research. Forestry research began in Ethiopia around the mid-1950s and in the 1970s with the establishment of the Forest Research Centre (FRC) and the Wondo Genet College of Forestry and Natural Resources (WGCF-NR), which is now part of Hawassa University. However, institutional instability and low financial and logistical support has hampered the development of the research system. Recently a new federal research institute called Ethiopian Forest and Environment Research Institute has been established. This institute is expected to foster the innovation and technological development needed in the fields of forestry and environment.

Besides, there are many research centers and universities such as Addis Ababa University, Hawassa University and Haramaya University that support research, innovation and technology development in the forest sector. However, for these institutes to serve their purposes, support is needed by building their human resources and research facilities. There are also several other actors that support forestry research and the development agenda in Ethiopia. CGIAR institutes such as ICRAF, CIFOR and others operate in the country. A number of local and international NGOs also operate in the country that are fostering the introduction, piloting and fine tuning of new innovations, while contributing to human and institutional capacity building.

Lack of coordination between various actors (government and non-government actors) is a major barrier in all these. A priority is therefore to set a national goal and direction and based on that coordinate all actors towards the fulfillment of the set goal.

8.7 Extension services

Extension service is an institutional support system to improve the management of natural resources, including forestry. Ethiopia's extension service system is said to be the third largest in the world, only after China and India (Swanson and Rajalahti, 2010). At each rural Kebele and per individual Farmers Training Center (FTC), there are three Development Agents (also extension agents), one of which is for NRM. This means there are at least 8,500 NRM Development Agents on duty across the country today, corresponding to the total FTC in the country.

A typical characteristic of forestry extension in Ethiopia is that it is provided as part of the agricultural extension system, by the NRM Development Agent. There are no dedicated forest rangers or forest extension agents that solely focus on forest or trees. Although forestry extension could still be delivered mixed with agricultural or NRM extension, there has been a lack of balance, with forestry often being overlooked. This is primarily due to the fact that agriculture development and ensuring food security has dominated the country's political and development agenda for decades, making the extension service become crop based. Moreover, the extension service system is housed under the MOANR, and DAs are supervised and managed by woreda office of agriculture staff. All agricultural or NRM extension services in Ethiopia are provided exclusively by the public government. In general, the current extension system suffers from a number of constraints, some of which are discussed below:



Low capacity and ineffective service delivery: Government staff at the district Offices of Agriculture and the DAs are low capacity experts, usually certificate or diploma level or at best BSc holders. These are hardly skilled and experienced enough to deal with and address specific constraints facing farm households, be it in crop, NRM or forestry. There is also high turnover of extension staff for further education due to low salary and lack of incentives to serve as extension agents over the long term. The shortage of operational budget and facilities, particularly transport and housing, also discourages DAs from making extension their long-term career and providing effective services.

Crop bias extension that undermines forestry: The existing extension system is crop biased, first due to the strong policy emphasis on food security and second due to the housing of the extension service system under the MOANR. Even though a NRM agent forms part of the team of extension agents, their focus is more on mass mobilization for watershed management, with strong emphasis on soil-water conservation and rehabilitation of degraded lands rather than on proper forest development for industry. In fact, the existing extension service discourages farmers from planting exotic tree species like eucalyptus, which on the contrary is the most preferred species by farmers, without providing alternative species choices. The extension system systematically excluded the production of seedlings of exotic tree species from government nurseries to discourage farmers from planting. Tree planting, when promoted, is done as mass planting, usually on degraded lands. Such plantings lack ownership, silvicultural treatments and protection to allow the seedlings to grow into mature trees and forests. This is why billions of seedlings are planted each year in the country but hardly grow to become a forest.

Top-down service delivery: In the delivery of some programs, the current extension service is also characterized by a top-down approach. Although there are exceptions, such as farmer consultation in watershed activities, at times this approach discourages DAs and woredas from dealing with local challenges

Given the above constraints, transformation in the existing extension system is needed such that both agriculture and forestry developments can be promoted together in a balanced manner so as to help the country achieve both food and wood security. Diversification of extension provision system in the country by involving private extension service provision is also recommended.

The Government of Ethiopia is committed to developing the forest sector recognizing the sector's potential in resilient and green economy building as well as industry development. The government's ambition to expand and modernize the forest sector calls for restructuring and transforming the existing extension system both in terms of organization, staffing and operation. There is a need for a forestry specific extension service delivery system housed under the MEFC. This also calls for the current TVET colleges to provide tailored training for the forest sector in addition to the current NRM training they offer. This will require a new curriculum to be developed. There is a need to produce extension personnel that can provide services that go beyond mere seedling production and number



reporting, to include those that focus on high quality seedling production, appropriate planting, stand tending (pruning, thinning, etc.), protection, harvesting and processing. The effectiveness of forest extension service delivery should be evaluated not in terms of the number of seedlings produced or planted but in terms of increased forest area, quality of standing forests and increased domestic supply of industrial wood.

Strengthening research-extension linkage is also needed to enhance service delivery and effectiveness of the forest extension system. Generation and availability of stock, new techniques, knowledge, inputs, skill and appropriate technologies is crucial for successful forestry development. Research needs to develop such technologies, package them in an appropriate extension package and make them available in an easy to extend way.

8.8 Financial capacity development

The GoE is following a “developmental state” model with a strong role for the government in many aspects of the economy, including the forest and financial sector. Accordingly, public finance and community in-kind contributions are the main financing instruments in the forestry sector. Currently, private financial institutions are not investing in commercial forestry and have only a limited role in the timber and NTFP processing sector.

Development partners have aligned their programs broadly with the GTP II priorities. Industrialization and agriculture, including forestry, are key priorities as drivers for sustainable economic development and job creation. Accordingly, a number of development partners have invested in the forestry sector. In the chapter below an overview of the financial capacity of the sector is provided.

8.8.1 Public resources (both fiscal budget and community contributions)

Several multilateral and bilateral initiatives provide financial incentives for the forestry sector in developing countries. Annual disbursements of official development assistance (ODA) to the sector ranges between approximately 400-800 USD million (2002-2014; OECD CRS). Funding is mostly targeted at productive uses and conservation of the forest, e.g. community forestry, biodiversity conservation, plantations and sustainable logging, and environmental services (Singer 2016) as well as at measures that address deforestation drivers from the agriculture sector.

In the Forestry Sector GTP II, a budget allocation of 110 bn Birr is earmarked for 5 years, which equals an average annual budget of 22 bn Birr. About 50% of the budget will be invested to increase the forest cover from 15.5% in 2015 to 20% by investing in boundary demarcation, forest protection and research. However, the annual budget allocation is determined by the Finance Minister.



Infobox: Climate Finance

An estimated USD 9.7 billion in donor finance has been pledged towards REDD+, with USD 4.6 billion of that for results-based finance (Center for Global Development 2015). Disbursements have however lagged behind, largely because the design and implementation of jurisdictional approaches is time consuming. Instead of supporting and financing the implementation of actions that lead to emissions reductions, RBF provides ex-post incentives for successful performance of those countries and jurisdictions that have implemented effective actions. As an ex-post payment is currently valued at 5 USD per ton of carbon, REDD+ RBF alone is unlikely to trigger the necessary political momentum and incentive for transformational change (Lee & Pistorius 2015). Several initiatives and programs however — such as FIP and the UN-REDD Program — provide substantial support to REDD+ countries with preparations and investments. Table 23 provides an overview of different financing instruments, their objectives and types of finance. Overall, the landscape of public incentives appears limited in its scope, as it lacks resources and instruments tailored to the productive forestry sector and to private sector engagement.

Table 23: Financing instruments, objectives and types

Finance instrument	Objective	Type of finance
Forest Investment Program	Supports developing countries' programmatic investments in forest mitigation and REDD+ Readiness efforts to access results-based finance.	Input-based grants and loans
Global Environment Facility	Addresses global environmental issues and sustainable development objectives. Serves as funding mechanism for Rio and other conventions.	Input-based grants and loans
FCPF Readiness Fund	Supports countries in REDD+ preparation by providing financial and technical assistance to access RBF	Input-based grants
FCPF Carbon Fund and BioCarbon Fund	Pilots REDD+ finance for jurisdictional programs	Results-based payments conditional upon emissions reductions from forest ecosystems
Green Climate Fund	Will support developing countries in mitigation and adaptation actions.	Flexible depending on fiduciary standards and abilities of implementing agencies
World Bank IDA	Supports government in realizing their development aims	Grants and concessional loans
World Bank IFC	Provides technical assistance to engage private sector	Grants and concessional loans
Climate Investment Fund (CIF)/PPCR	Provide climate finance to developing and middle-income countries to achieve transformation of sectors contributing to climate change	Grants and concessional loans
Bilateral donor contributions	Support developing countries' development objective, project and program financing	Grants



8.8.2 Private investment

The private sector in Ethiopia includes individual households and companies. The former play a key role also in the forestry sector. The latter are often underdeveloped, undercapitalized, overstaffed and lacking the resources to utilize the existing capacity. However, given the employment and import substitution benefits, industrialization in all suitable sectors is a key priority in the GTP II.

Considering Ethiopia's forests generate economic benefits in cash and in-kind income equivalent to USD 16.7 billion, or 12.9% of the measured value of GDP in the fiscal year 2012-2013 (UNDP 2016), there is significant potential to attract private investment into the forestry sector and the timber and NTFP industry sector.

Private investments today focus mainly on quick and high yielding returns, e.g. in the urban housing development and hotel sector. Given the limited financial resources, forestry projects are less attractive, particularly the establishment of commercial plantations with high upfront investments and late positive cash flows.

The Government of Ethiopia already provides incentives to attract private investments, and currently, forestry projects are second only to industrial zone development in terms of investment benefits. However, there aren't any projects registered so far that invest in commercial plantation development using these tax incentives. In the absence of access to long-term financing to start the business and to build the infrastructure, tax incentives alone cannot motivate private investments. To complement the existing incentive packages, there is a need to address the identified barriers related to availability of ready-to-invest land, access to finance, and technical and administrative support.

8.9 Development partners

The World Bank, UNDP, Norway, Germany, Sweden, UK, EU and Japan are the main development partners active in the forestry sector. The table below lists the major ongoing forest sector specific investments. It is estimated that development partners are investing between USD 100 million to 200 million annually in the forestry sector. This equals 10% to 20% of the planned GTP II forest sector budget. Table 24 is not conclusive and ignores e.g. smaller investments (< USD 5 million) and most of the cross-sectoral investments e.g. in SLM that focus on agriculture, but partly contribute to tree planting activities in watersheds. A number of biodiversity programs that are not forestry specific e.g. from the German development bank KfW, are also not considered.

**Table 24: Ongoing development partner investments in the forestry sector in Ethiopia**

Development partner	Amount in million USD	Period	Notes
UNDP Institutional Strengthening for the Forest Sector Development in Ethiopia	10.5	2015-2016	Financed by Norway
UNDP Institutional Strengthening for the Forest Sector Development in Ethiopia	5	2017-2020	Financed by Sweden
GIZ Biodiversity and Forest Program (BFP)	16.5	08/2015 to 07/2019	Financed by Germany (BMZ)
KfW Biodiversity and Forest Program (BFP)	20*	2017 to 2020	Financed by Germany (BMZ)
World Bank FCPF REDD Readiness	13.6	2012-ongoing	Norway, UK
World Bank BioCF Oromia Forested Landscape program	68	2016-2020 2016-2026	Mobilization grant, Emission reduction payments Financed by Norway and UK
JICA Certified Forest Coffee Production and Promotion Project	5	2014-2019	Financed by Japan
Norway Green Partnership with EU and UK (agriculture, forestry, energy), Forest Sector Development Project		2011-2020	\$60 M per year
Sustainable Land Management Program II	250	2013-2019	Convenes finance from US, Norway, Canada, Germany and GEF to finance PFM and landscape restoration
Rural Economic Development and Food Security (RED-FS) Program	4.6 Billion	Since 2008	Not all is direct forest investment, but most has direct impact on land use change

Source: EU donor mapping, various sources, * to be confirmed.

8.10 Barriers to institutional development

The forest sector in Ethiopia has remained weak, and unable to divulge the potential environmental, social and economic contribution of the sector to the overall development of the country. The sector's contribution to the GDP, import substitution, export diversification as well as employment generation remains very low. The institutional arrangement of the sector has been characterized by frequent structuring and re-structuring, not only due to political instability but also during a single political regime, undermining continuity of programs, cumulative learning and innovation. For the past several decades, forestry was hosted as a small unit within the agriculture sector with limited budget and logistic support. This has contributed to its institutional weakness and poor performance. There are also several other barriers to forest sector institutional development. Some of these include:



- **Lack of a clear vision, forest management objectives and national goal:** Forest sector goals and vision are not properly defined for the country, and it has been difficult to understand what the forest management objectives of the country are. National or sub-national land use plans are also absent, and there are no delineated and mapped areas of land for forest development. This is a clear constraint to the development of a vibrant and strong forest institution. The dominant view with regards to forest management objectives in Ethiopia has been protection or conservation. This view has masked the economic importance of forestry, making it unable to win political attention for sufficient budget and logistic support, and for institutional innovation.
- **Lack of effective intersector coordination:** Coordination among sectors, particularly among those sectors competing for land (forestry and agriculture) has been very weak. In fact, for a long time there has been clear political bias towards agriculture leading to deforestation and forest degradation to be tolerated, law enforcement to remain weak and making it difficult to solicit productive land for forest development. Similarly, coordination among different forest governance levels (federal-regional-local levels) remained weak hindering a coordinated national scale development planning and implementation.
- **Poor human resource and capacity:** Forestry institutions have been understaffed and most of the professionals working in the various offices, particularly at decision-making levels, also lack experience and skills. Therefore, they were unable to design and implement innovative policies, programs and institutional setups to elevate the economic and social roles of forestry. Most staff is directly recruited from university without having extensive practical experience.
- **Poor engagement of the private sector as agents of change:** The forest sector in Ethiopia is characterized by the dominance of public investment with little or no contribution from the private sector. This is also due to the lack of implementation of existing incentives to encourage private sector involvement in the sector.

Opportunities for forest sector institutional development

Overall, the above limitations cause forestry education in Ethiopia to fall short of producing the quality human resources required for sector development. Given the time lags in training high-quality professionals, efforts need to be made immediately if the sector is to play its part in fostering economic development of the country. The curricula should better reflect practical needs; global technological advancements in the field.

In order to fulfill the human resource demand of the sector, there is a need to restructure and enhance the available training system (TVET/Universities), particularly with respect to their curricula. Practical-oriented skills should replace theoretical training and growing fields such as bio-technology and forest enterprises, will need to be emphasized.



Expansion of the higher education system in the country, coupled with the government's growing interest in the forest sector and expanding private sector involvement are important opportunities to re-think forestry education in the country. Employment is expected to grow in the field. Universities can also have more chances to provide their students with practical placements in industry, giving them real-world experience during their studies.

Beside the increase in the sheer number of students, an important aspect to be considered is the quality of students placed in forestry education. Furthermore, the teaching staff skills should be expanded through industry attachment, recruiting people with industry experience should be a key objective moving forward.

Innovation and technological capacity advancement is needed at all levels of the forestry value chain — from seed technology through to the nursery (commercial, technology supported quality seeding production) through to primary (lumber processing) and secondary (value added, e.g. furniture) forest industry development.

9 NFSDP Targets - Review of Existing Relevant National and International Commitments

In terms of setting targets for the forest sector development program, it is highly important to review first the existing different international commitments and national targets set by the government that are relevant to the forest sector. These combined targets will form the foundation for formulation of action programs in Phase 2. The targets are summarized here based on the four program pillars of the NFSDP.

Forest production and value chain program area

Target 1: Increasing the contribution of the forest sector to the GDP to 8% by 2020 (GTP II)

Target 2: Afforesting/reforesting 300,000 ha of commercial plantations to bridge the current gap between demand and supply (FSR 2015)

Target 3: Increasing the forest cover of the country to 20% by 2020 (GTP II)

Target 5: Increasing forest sector employment to 2 million by 2020 (MEFCC GTP II).

Forest environmental function program area

Target 1: Carbon neutral economy by 2030

- Afforestation/reforestation of 3 million ha (CRGE)
- Sustainable forest management of 4 million ha (2 million ha forests & 2 million ha woodlands)

Target 2: Forest landscape restoration of 22 million ha (Commitment to Bonn Challenge¹⁰ – 15 million ha, and NY Declaration – 7 million ha). This target includes the 7 million ha AR and sustainable forest management target set in the CRGE as indicated in Target 1.

Target 3: Increased coverage of forest protected areas to 17% (CBD Aichi Nagoya target)

Urban greening and urban forests

Target 1: Improving urban forest management in 11 regional capital cities (MEFCC GTP II)

Target 2: Increasing green area development and public recreation land utilization coverage to 30% by 2020 (GTP 2)

Forests and rural livelihoods

Target 2: Watershed development program target of 41.35 million ha by 2020 (GTP II)

Target 3: Land degradation neutrality target (Box 4, commitment to UNCCD LDN)

Target 4: Registration, demarcation, and legal accreditation of the NFPA by 2020 (MEFCC GTP II)

Institutional development program area

Target 1: Enacting the revised forest proclamation and forest regulation

Target 3: 100,000 households benefitting from green economy development technologies (GTP 2)

Target 4: Establish central forest data base (MEFCC GTP II)

Target 5: Mobilizing 400 million USD for sector support from development partners (MEFCC GTP II)

Figure 24 shows targets that were identified leading up to the UNFCCC meeting in Paris by the national Working Group on land degradation.

¹⁰ Ethiopia's commitment to forest landscape restoration: <http://www.bonnchallenge.org/content/ethiopia>.



Figure 24: Voluntary targets to achieve land degradation neutral environment in Ethiopia

- **Target 1:** By 2031, promote the implementation of community based forest management, forest landscape restoration with indigenous species, avoiding overgrazing, area closure and, alternative livelihood systems, and ensure the restoration of 427,730 ha of forest land lost between 2000 and 2010.
- **Target 2:** By 2036, ensure the rehabilitation and improvement of the productivity of 21,359,490 ha of forest land by stopping uncompensated conversion of forest area, especially in slopes, into grassland, cropping or urban areas, and promoting agroforestry, energy saving stoves and, alternative livelihood systems, in order to avoid reduction of carbon stock and limit the risk of erosion.
- **Target 3:** Improve the productivity of 314,990 ha of shrubs, grasslands and sparsely vegetated areas by 2040 by avoiding overgrazing, promoting controlled grazing, and rangeland management/improvement.
- **Target 4:** By 2040, rehabilitate and improve the productivity of 12,578,714 ha of shrubs, grasslands and sparsely vegetated areas by stopping uncompensated conversion of permanent grasslands into croplands, promoting controlled grazing, and rangeland management/improvement so as to avoid reduction of soil carbon stock.
- **Target 5:** By 2031, ensure improved productivity of 14,193,615 ha of cropland by reverting negative trends of arable land deterioration, including acidification, alkalization and salinization, erosion by strongly discouraging inappropriate practices and supporting soil, water and vegetation long-term conservation practices; drastically limiting the size of individual parcel to the maximum permitted to conserve biodiversity and natural regeneration potential, through agroforestry and green corridors and biodiversity grids, especially in large-scale commercial farms; accelerating the conversion of unsustainable to sustainable cropping, grazing, forestry in the framework of scientifically grounded watershed management plans implemented under legally binding long-term agreements and contracts; and 100% of cropland shows a stable increase of land productivity capacity.
- **Target 6:** By 2026, ensure improved productivity of 72,766 ha of wetlands and water bodies by stopping uncompensated conversion of wetlands into cropping or urban, industrial or infrastructure areas, in order to avoid depletion of carbon stock and critical biodiversity.
- **Target 7:** Take urgent and significant actions like stopping uncompensated artificialization/urbanization of arable lands, through urban densification and “building city on city” approach; restoring as much land degraded by pollution, originated by urban, industrial, mining untreated contaminants as possible; revitalizing vegetation in degraded slopes, dried lands, closed mines, infrastructure (airports, harbors, roads, dams and reservoirs) using pools of endogenous species and further sustainable use and promoting plantation of indigenous tree species, and improve the productivity of 33,452 ha of artificial areas by 2026.
- **Target 8:** Through sustainable land management practices particularly implementing biophysical soil and water conservation practices improve the productivity of 3,751,173 ha of bare land and other areas by 2036.
- **Target 9:** By 2040, ensure the increase of carbon stock in the country by 148.67 million tons of carbon between 2016 and 2040 by achieving the above mentioned targets.

Source: FDRE (2015)

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11 Annex

Annex 1: Glossary of Terms

“Adaptive capacity” The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences (Fussel and Klein, 2006). When applied to forests, ‘adaptive capacity’ consists of the inherent capacity of trees and forest ecosystems to adapt to climate change, and of socio-economic factors determining the capability to implement planned adaptation measures (Lindner, 2010). Adaptive capacity is therefore influenced by the capacity of the community or other institution that manages a forest to respond to the consequences of climate change, and the level of management response in any particular forest or forested area.

“Disturbances” are an external shock or stress that disrupts ecosystems, communities or populations, and creates new opportunities for alternative regimes to become established (Resilience Alliance 2011). There are many examples in the resilience literature of disturbances, whether ecological disturbances such as forest fires and forest pest outbreaks or social disturbances, but other examples not fully studied through a resilience framework yet include technological changes and economic disturbances such as recessions and innovations (Peterson 2002; Ludwig et al. 2002; Delcourt & Delcourt 2004; Schoon & Cox 2011).

“Impacts” Consequences of climate change on natural and human systems. Depending on the consideration of adaptation, one can distinguish between potential and residual impacts (Fussel and Klein, 2006).

“Readiness” measures a country’s ability to leverage investments and convert them to adaptation actions.

“Resilience” is *“the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses — such as earthquakes, drought or violent conflict without compromising their long-term prospects”* (DfID 2011). The emphasis on resilience is multi-dimensional. At root, the question of resilience is nearly the same as the question of the sustainability of livelihoods, but with a greater emphasis on the ability to cope with, and recover from, shocks or disasters.

From an ecological perspective, “resilience” is defined as *“a systematic property that refers to the magnitude of change a system can experience before shifting into an alternative state – for example with different hydrological cycles, levels of primary productivity, social relations and economic prosperity”* (Walker et al. 2004). The use of the term resilience emerged in the field of ecology in the 1960s, introduced as a measure of the disturbance that can be tolerated in a system whilst retaining the same structure and function (Holling 1973). As resilience declines, smaller changes (or “disturbances”) will have a larger effect, and eventually a threshold will be crossed moving the system into a different state and a different set of controls (Carpenter et al. 2001; Holling 1973; Walker et al. 2009).



“Sensitivity” The degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct or indirect (Fussel and Klein, 2006).

“Vulnerability” The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC, 2001).

Annex 2: Projects and Programs that Support Land Certification and Sustainable Land Management in Ethiopia

Partner	Project	Duration	Budget	Goal
FDRE	National Land Administration and Land Use Development Project (ELALUDEP)	2011-2016	??	To strengthen the country's land administration and management systems at all levels of Government for efficient and transparent land service delivery to be achieved through: • A clear, coherent and consistent set of land administration policies and laws; • A land administration system operating throughout Ethiopia that provides efficient services that are well understood by the general public and with the resources and capacity that ensures sustainability; and • A systematic program to update existing land records and to register and certify rights over land.
DfID	Land Investment for Transformation (LIFT) Program	6.33 years 2013/14 to 2019/20	Between £45 and £68.2 million	The support will provide interventions in the following areas: 1. Increasing land tenure security 2. Supporting the development of the rural land sector and supporting operations 3. Addressing cross-cutting policy issues including strengthening the existing land policies and procedures, with the aim of enhancing security of tenure for communal land holdings, pastoralists and customary land use and improving the transparency of land allocation.
USAID	USAID/Ethiopia projects - Ethiopia Strengthening Land Tenure and Administration Program (ELTAP)	2005-2008	\$5,747,422	This project contributed to: a) Familiarization of the GoE to similar experiences in other countries in land leasing arrangements; b) Harmonization of regional land policies on issues such as women's inheritance and leasing arrangements; c) Expansion of cadastral work; and d) Education of farmers of their land use rights. The project formulated the “Action Plan for Land Tenure”, which was adopted by the government as its framework.
USAID	Ethiopia Biodiversity and Tropical Forests Assessment	2008	??	Ethiopia Biodiversity and Tropical Forests Assessment in 2008, mandated by U.S. law as part of its country planning process.

Partner	Project	Duration	Budget	Goal
USAID	the Ethiopia Land Administration Program (ELAP)	2008-2012	\$5,000,000	To strengthen Ethiopia's land administration system, promote tenure security, increase public awareness of land rights, and strengthen the capacity of federal and regional land administration agencies. Objectives • Improve the legal framework related to land use rights at the national and regional levels. • Advance public awareness of land use rights. • Promote investments by smallholders, medium and larger-scale investors in productivity enhancing technologies and activities. • Strengthening the capacity of federal and regional land administration agencies to deliver secure land use rights and land administration services.
USAID	Land Administration to Nurture Development (LAND) Project	2013-2018	\$11,000,000	The LAND project works at national and regional levels of government to further improve the legal and regulatory framework related to land tenure and property rights and thereby support the Government of Ethiopia's and USAID's goal of increasing economic growth, particularly agricultural sector growth, improving rural resiliency, and improving governance. LAND uses a variety of activities to strengthen capacity of land administration and land use institutions. In addition, LAND supports activities focusing on securing rights to community lands, strengthening capacity of community members to manage their natural resource assets.
World Bank	Sustainable Land Management Project-I	2008-2013	US \$28.79 million	SLMP-1 significantly contributed to the introduction of bestfit and tested sustainable land and water management practices in selected areas. Under the Project, remarkable progress was achieved in rehabilitating selected degraded areas which were previously uneconomical and unproductive. Implemented in 45 critical watersheds in six regions (Amhara, Tigray, Oromiya, Southern Nations, Nationalities and Peoples, Gambela, and Benshangul Gumuz), the project supported integrated approaches to natural resource management.
World Bank	Sustainable Land Management Project-II	2013-2019	US \$107.6 million	To reduce land degradation and improve land productivity in selected watersheds in targeted regions in Ethiopia. Component 1: Integrated Watershed and Landscape Management: (Cost \$73.98 M) Component 2: Institutional Strengthening, Capacity Development and Knowledge Generation and Management: (Cost \$16.98 M) Component 3: Rural Land Administration, Certification and Land Use: (Cost \$12.20 M) Component 4: Project Management: (Cost \$4.45 M)
Finland	Responsible & Innovative Land Administration in Ethiopia (REI-LA)	2011-2016	12.8 MEUR	Improved livelihood and economic wellbeing of the rural population through promotion of sustainable land management practices. With this intervention, it is planned to contribute towards an improved, transparent and appropriate land administration system in Ethiopia.
Farm Africa – SoS Sahel (partnering with GIZ)	Forest Management Projects	1990s till present		Africa/SoS Sahel in 1995 in Chilimo and Bonga. Support to expand the WAJIB participatory forest initiative to other areas of the country.



Partner	Project	Duration	Budget	Goal
SIDA through FAO	??	??	??	Supports both forestry research and training at the Wondo Genet Forestry College.
UN FAO	National Forest Program (NFP) facility	??	??	UN FAO is providing forestry sector support through its National Forest Program (NFP) facility.
EC			Euro €?? Million Euro €6 million	The European Commission is providing extensive support for projects developing forest livelihoods, payment for environmental services, and sustainable forest management in SNNP and Oromia regions. The EC recently announced a six million Euro grant to expand the scope of participatory forest management in Ethiopia.
World Bank	FCPF			World Bank is supporting the Forest Carbon Partnership Facility, of which Ethiopia is a member. The initiative will focus on building Ethiopia's capacity to participate in carbon markets through Reduced Emission due to Deforestation and Degradation (REDD) efforts.
World Bank		2007 - ??	US\$2 million	Expansion of the Former Women Fuel Carriers Association (FWFCA) to 30,000 members, focused on securing the access rights of female wood gatherers to eucalyptus plantations where wood-cutting is allowed, developing alternative livelihood options, and providing training in forest management and sustainable harvesting techniques.
GTZ	Integrated Food Security Project (IFSP) – Shire	1993-2000		Shire Zone, Tigray Region
GTZ	Tigray Tree Nursery Rehabilitation Project (TTNRP)	1994-2000		Tigray Region
GTZ	Adaba-Dodola Integrated Forest Management Project (IFMP)	1994-2000		Adaba-Dodola Forest, Oromia Region
GTZ	Integrated Food Security Project (IFSP) – South Gonder	1996-2004		South Gonder Zone, Amhara Region
GTZ	Land Use Planning and Natural Resource Management Project in Oromia Region (LUPQ)	1997-2004		Oromia Region
GTZ	Forest Genetic Resources Development Project (FGRDP)	1998-2005		National coverage
GTZ	Social Forestry Project Tigray (SFPT)	2001-2005		Tigray Region

Partner	Project	Duration	Budget	Goal
GTZ	Sustainable Utilization of Natural Resources for Food Security (SUN)	2005-2008		Amhara, Tigray and Oromia Regions
GTZ	Sustainable Land Management Program (GIZ-SLM)	2009-2015		Amhara, Tigray, Oromia, SNNPR, Benishangul-Gumuz and Gambella Regions

Source: Compiled from multiple sources including: GIZ Ethiopia: Lessons and Experiences in Sustainable Land Management.

Annex 3: Forest Sector related GTP II Targets

No	Sector/ Indicator	Unit	Baseline Year (2014/15)	Target Year (2019/20)	Remarks
1	Natural Resource Conservation and Utilization				
1.1	Area of land rehabilitated	Million ha	11.7	22.5	This target has a link with Forest Landscape Restoration
1.2	Area of land with community based watershed development	Million ha	12.16	41.35	This target has a link with Forest Landscape Restoration
2	Climate-Resilient Green Economy Development				
2.1	Households benefitting from green economy development technologies	No.		100,000	Forest sector technology packages should contribute to fulfill the target. The use of green energy technologies also reduce pressure on forest resources.
2.2	Reduced GHG emissions	Million tons		147	REDD+ and AR projects
2.3	Share of forest sector in GDP	Percent	4	8	NFSDP implementation should contribute to this target.
2.4	Forest coverage	Percent	15.5	20	NFSDP implementation should contribute to this target.
3	Water and Energy				
3.1	Electricity service coverage	Percent	60	90	Increased access to electricity will reduce burden on forest resource base for firewood.
3.2	Length of distribution lines constructed	Km	12,825	21,728	Increased demand for utility poles.
4	Urban development, housing and construction				
4.1	Green area development and public recreation land utilization coverage	Percent		30	NFSDP implementation should contribute to this target.
4.2	Urban residential houses constructed	Number	157,070	750,000	Increased demand for construction wood and furniture.
5	Industry				
5.1	Manufacturing industry share in GDP	Percent	4.6	8.0	Huge opportunity for expanding wood-based manufacturing industry.



Annex 4: National Forest Priority Areas of Ethiopia

S. No.	Name of National Forest Priority Area	Slightly Disturbed High Forest (ha)	Highly disturbed High Forest (ha)	Total High Forest (ha)	Man Made Forest (ha)	Other Forest Area (ha)	Total (ha)
1	Abelti-Gibe		4,700	4,700	1,300	4,000	10,000
2	Abobo-Gog	150,000	45,000	195,000	100	22,900	218,000
3	Aloshe-Batu-Adaba-Dodola		10,000	10,000	1,700	28,300	40,000
4	Anferara-Wadera		13,000	13,000	3,700	89,900	106,600
5	Arba Gugu		6,300	6,300	1,600	13,500	21,400
6	Babya Fola		45,000	45,000	900	28,400	74,300
7	Belete-Gera	76,500	35,200	111,700	1,100	35,700	148,500
8	Bonga	7,000	10,000	17,000	2,100	142,300	161,400
9	Bore-Anferara		33,000	33,000	1,400	182,900	217,300
10	Bulki-Malakoza				500	10,500	11,000
11	Butajira				1,600	13,400	15,000
12	Butuji-Melka-Jebdu				3,800	41,400	45,200
13	Chato-Sengi-Dengeb		5,000	5,000	60	39,800	44,860
14	Chilimo-Gaje		2,000	2,000	800	23,200	26,000
15	Cilalo Galema				1,400	20,600	22,000
16	Denkoro		2,300	2,300		3,000	5,300
17	Desa			0		20,000	20,000
18	Dindin Arbagugu		3,300	3,300	5,900	57,600	66,800
19	Gara Mulata		2,600	2,600	2,000	2,400	7,000
20	Gebre Dima	50,000	82,000	132,000		33,000	165,000
21	Gedo	2,000	3,000	5,000		5,000	10,000
22	Gergedda	20,000	20,000	40,000	1,000	96,400	137,400
23	Gidame		10,000	10,000		7,000	17,000
24	Gidola-Gamba	15,000	5,000	20,000		10,000	30,000
25	Gidole-Gamba				1,200	14,800	16,000
26	Godere	40,000	100,000	140,000	500	19,500	160,000
27	Goro-Bele	9,800	50,000	59,800	200	40,000	100,000
28	Guangua-Kaihtas		32,000	32,000	2,800	21,700	56,500
29	Gumburda-Grakaso		11,500	11,500	2,200	12,300	26,000
30	Gura Ferda	80,000	35,100	115,100	800	24,100	140,000
31	Harena-Kokosa	20,000	70,000	90,000		92,000	182,000
32	Jalo-Muktar-Metakesha-Addes		2,500	2,500	4,100	14,700	21,300
33	Jaro-Gursum		1,500	1,500	4,500	46,300	52,300

S. No.	Name of National Forest Priority Area	Slightly Disturbed High Forest (ha)	Highly disturbed High Forest (ha)	Total High Forest (ha)	Man Made Forest (ha)	Other Forest Area (ha)	Total (ha)
34	Jibat-Mute-Jegefo		5,000	5,000		33,500	38,500
35	Jurgo-Wato		15,000	15,000	200	4,700	19,900
36	Komto-Waja-Tsege		1,000	1,000	1,200	6,900	9,100
37	Konchi		5,000	5,000		8,000	13,000
38	Kubayu	5,000	17,900	22,900	300	55,200	78,400
39	Linche-Dali-Gewe	10,000	15,000	25,000		25,000	50,000
40	Logo	5,000	16,400	21,400	900	36,700	59,000
41	Megada	5,000	10,000	15,000	1,300	4,500	20,800
42	Mena-Angetu	20,000	50,000	70,000	200	119,800	190,000
43	Menagesha-Suba		3,600	3,600	1,300	4,900	9,800
44	Messenigo	292,350		292,350	650	32,000	325,000
45	Munesa Shashemene	7,000	10,200	17,200	6,800	74,200	98,200
46	Negele		1,200	1,200	300	16,300	17,800
47	Sekela Mariam				2,000	8,000	10,000
48	Sele-Anderacha	100,000	115,000	215,000	700	9,300	225,000
49	Sibo-Tale Kobo	28,000	50,000	78,000	1,900	20,100	100,000
50	Sigmo Geba	67,700	190,000	257,700	2,300	20,000	280,000
51	Tiro Boter Becho	16,000	23,300	39,300	2,300	44,200	85,800
52	Wangus	329,900		329,900		85,100	415,000
53	Wof-Washa		2,000	2,000	4,200	2,700	8,900
54	Yabelo-Arero		8,000	8,000	150	41,750	49,900
55	Yayu	20,000	100,000	120,000	300	29,700	150,000
56	Yegof-Erike		2,800	2,800	8,400	6,800	18,000
57	Yeki	10,000	100,000	110,000	500	11,500	122,000
58	Yerer-Diregebrecha-Zukala	300	3,800	4,100	1,700	3,800	9,600
	Total	1,386,550	1,385,200	2,771,750	84,860	1,921,250	4,777,860

Source: EFAP (1994). Note: These NPFAs are proposals that were made in 1980. Most NPFA are not yet legally protected and their actual status is not clear.



Annex 5: Protected Wildlife Areas of Ethiopia, with their area

S. No.	Name of the Protected Wildlife Areas	Location	Year established	Area In km ²	Category
1	Awash	Oromiya & Afar(F)	1958	756	National park
2	Simian Mountains	Amhara R. S(F)	1959	412	National park
3	Alatish	Amhara R. S(F)	1997	2,666	National park
4	Bahir Dar Blue Nile river Millennium	Amhara R.S	2008	4,729	National park
5	Borena saynt	Amhara R.S	2001	4,325	National park
6	Bale Mountains	Oromiya R.S(F)	1962	2,200	National park
7	Abijata lakes	Oromiya R.S(F)	1963	887	National park
8	Omo	S.N.N.P R.S(F)	1959	3,566	National park
9	Nech sar	S.N.N.P R.S(F)	1966	514	National park
10	Mago	S.N.N.P R.S	1974	1,942	National park
11	Chebera Churchura	S.N.N.P R.S	1997	1,190	National park
12	Maze	S.N.N.P R.S	1997	202	National park
13	Yangudi-rassa	Afar R.S(F)	1969	4,731	National park
14	Gambela	Gambela R.S(F)	1966	5,061	National park
15	Geraile	Somali R.S	1998	3,558	National park
16	Dati Wolel*	Oromia R.S	1998	1035	National park
17	Borena*	Oromia R.S	1978	3730	National park
18	Gibe Sheleko	S.N.N.P R.S	2001	248	National park
19	Loka Abaya	S.N.N.P R.S	2001	500	National park
20	Kafeta Shiraro	Tigray R.S(F)	1999	5,000	National park
21	Arsi Mountains*	Oromiya R.S	1986	931	National park
22	Gibe Valley	S.N.N.P R.S			National park
23	Babile elephant	Oromiya & Somali R.(F)	1962	6,987	Wildlife sanctuary
24	Senkele	Oromiya & S.N.N.P R.S(F)	1964	54	Wildlife sanctuary
25	Tama	S.N.N.P R.S	-	1,665	Wildlife reserve
26	Chelbi	S.N.N.P R.S	-	4,212	Wildlife reserve
27	Abasheba Demero	Oromiya R.S	1994	210	Controlled hunting area
28	Areba-Gugu*	Oromiya R.S	1995	321	Controlled hunting area
29	Dindin	Oromiya R.S	-	280	Controlled hunting area
30	Besemena-Odobulu	Oromiya R.S	1993	350	Controlled hunting area
31	Munessa-Kukie	Oromiya R.S	1993	111	Controlled hunting area
32	Shedem Berbere	Oromiya R.S	1988	170	Controlled hunting area
33	Hanto	Oromiya R.S	1991	190	Controlled hunting area
34	Bilen Hertalie	Afar R.S	-	1,090	Controlled hunting area



S. No.	Name of the Protected Wildlife Areas	Location	Year established	Area In km ²	Category
35	Chifera	Afar R.S	1998	510	Controlled hunting area
36	Telalak-Dewe	Afar R.S	-	457	Controlled hunting area
37	Murullie	S.N.N.P R.S	-	690	Controlled hunting area
38	Wilshet-Sala	S.N.N.P R.S	2000	350	Controlled hunting area
39	Sororo-Torgam	Oromiya R.S	2000	78	Controlled hunting area
40	Haro Abadiko*	Oromiya R.S	2000	248	Controlled hunting area
41	Urgan Bula	Oromiya R.S	2000	78	Controlled hunting area
42	Hurfa Soma	Oromiya R.S	2000	215	Controlled hunting area
43	Adaba-Dodola	Oromiya R.S	2000	736	Controlled hunting area
44	Gara Gumbi	Oromiya R.S	-	140	Open hunting area
45	Gara Miti	Oromiya R.S	-	240	Open hunting area
46	Alluto*	Oromiya R.S	-	89	Open hunting area
47	Sinana	Oromiya R.S	-	15	Open hunting area
48	Jibat	Oromiya R.S	-	97	Open hunting area
49	Debre Libanos	Oromiya R.S	-	31	Open hunting area
50	Gelila Dura	Afar R.S	-	140	Open hunting area
51	Simien Gibe	S.N.N.P R.S	2001	49	Community Conservation area
52	Garameba	S.N.N.P R.S	2001	25	Community conservation area
53	Guassa	Amhara R.S			Community conservation area

Source: <http://ewca.gov.et/en/node/27> (Accessed on 11 June 2016), Note: 'R.S' stands for Regional State. '(F)' stands for Adminis-tered by the Federal government.



